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A Comparative Analysis of the University of Arkansas Economics Program

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Comparative Analysis of the University of Arkansas Economics Program

by

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Abstract

In the University of Arkansas economics program, many students have expressed that when enrolled in upper division coursework they do not feel they are well prepared mathematically for the material that is being taught. The purpose of this thesis is to compare the University of Arkansas (UA) economics program (Fulbright and Walton) to high performing, peer, and aspirant institutions and determine how the UA economics department might be able to imitate a high performing structure using the offerings and faculty that are already present, as well as new offerings that could be added should resources become available. Using information from these institutions and feedback from faculty and student surveys, it is first recommended that the economics department develop a marketing strategy to give economics student's better information regarding courses available to them. Next, it is recommended that the economics department begin conducting senior exit interviews/surveys to gain student feedback on a more regular basis, like exit interviews that are conducted at the University of Florida. It is also recommended that the Economics department create stronger quantitative requirements for all economics students to include Introduction to Econometrics and a Calculus 1 & 2 sequence, like requirements set at The University of Oklahoma and the University of Texas-Austin. Additionally, it is recommended that current economics course offerings be grouped into concentrations to cater to specific post-graduate needs of students, similar in organization to Louisiana State University, the University of Indiana, and the University of Georgia. Also, it is recommended that the department create a Bachelor of Science degree plan with increased quantitative requirements like the University of Missouri B.S. degree plan. Following this prescription, the University of Arkansas economics department would become even more competitive in recruiting undergraduate students to declare a major in economics.

Research Topic

Problem

Consistently in several upper level economics courses University of Arkansas Undergraduate students have expressed that they are not well prepared mathematically for the material that is being taught. Some of these students have pursued additional education in math or statistics by pursuing minors in mathematics, statistics, or the newly offered business analytics minor. Some students take survey of calculus and finite math at UA and that is the end of their quantitative training. Other students, however, may elect to take math courses at less rigorous institutions as transfer students to receive the credit required to graduate. The students who do not readily pursue additional instruction in math—who also make up most of economics students—are not as prepared to take upper level coursework. This might result in poor performance in upper level courses as well as lessen the depth of instruction that faculty can pursue in a given semester. A history of poor performance or poor final grade in difficult upper division courses may cause fewer students to declare a major in economics (resulting in fewer resources), but on the other hand, a lesser quality instruction diminishes the value of the student's degree.

Hypotheses

Do the University of Arkansas economics faculty/ undergraduate students believe the economics degree plan is lacking in mathematics instruction?

Do the University of Arkansas economics faculty/students believe the economics degree plan is lacking in course offerings?

Does the University of Arkansas economics degree plan lag peer and aspirant institutions in curriculum requirements?

Theoretical Basis

Over the last 20 years, colleges and universities across the nation have experienced record levels of enrollment which is thought to be the result of an increasing population of college age students, increasing enrollment rates, and accessible student loans. As the total amount of students has increased, bottom tier institutions have also seen an increase in enrollment. (Belkin) According to The Wall Street Journal/Times Higher Education ranking, there is a growing divergence between high performing and low performing institutions. The Journal ranking includes most major public and private colleges and has focused on "how well a college prepares students for life after graduation". This analysis found that poor performing institutions were more likely to have a decreasing enrollment. Belkin suggests that because of increased competition between institutions, students will choose colleges and universities that will prepare them better for post-graduation opportunities. The institutions that offer this preparation are then the recipient of student's tuition dollars as opposed to the institutions that are experiencing a decline in enrollment and thereby tuition revenue. Many institutions in this latter category are now struggling to create programs and course offerings to entice students to enroll.

On the Wall Street Journal/Times Higher Education ranking, the University of Arkansas ranks 437, a ranking that includes scores for outcomes, resources, engagement, environment, and default rate. The University of Arkansas has experienced tremendous growth over the last two decades 12.3 percent growth between 2012 and 2017, however in the fall of 2017 the growth rate was 1.3 percent (Newswire), according to Chancellor Steinmetz this is "the type of controlled, quality growth that the University is striving toward". The fall 2017 class of students are among the highest qualified class of students to be admitted with an average GPA of 3.69 and an average ACT of 26.2. However, this is not a time for the University to rest on its achievements. With an increasingly more qualified freshman class, course offerings and curriculum must adapt in order to provide a rigorous educational experience for the students currently enrolled and those who will enroll years from now.

The Walton College of Business is no exception to trend the trend of growth with approximately 25% of students of the Undergraduate population in 2016 declaring a major through the College of Business (WCOB) (UA Admissions). With so many students enrolling as business majors there has been an increase in the number of students in many majors and this growth has created an environment where departments compete against one another for students and the funding that comes with a larger number of majors. Departments might attract students to declare a major by requiring courses that are perceived to be easier or marketing the major as one that will result in a lucrative post-graduation career. This gives rise to the dilemma that is faced in the economics department. Because economics requires a strong foundation in mathematics (Mankiw) it is more difficult to create easier course offerings that might appeal to the average student. An increased mathematical requirement often results in a more intuitive understanding of economic concepts and theories which could be leveraged on a resume or in interviews to land a job in a desired career path. (Survey 2.2) Another population to consider are undergraduate economics students who aspire to attend graduate school in economics but lack the required math

background to be admitted to graduate programs. The current economics offerings (BA, BSIB, and BSBA) do not cater to these types of students and oftentimes these students must discover on their own what courses or other degrees, in addition to economics, they must take that will give them an advantage in graduate school applications and admission.

The internal competition for students is the basis for this thesis as departments have a finite number of resources (instructors, classrooms, funding, etc.) to teach students and to attract faculty/instructors. In an informal survey sent to the economics faculty, there was a significant concern that students were not "mathematically mature" enough for students to understand the depth of instruction that many faculty members would like to give. (Survey 1.2) The initial response to this feedback is that the degree plans should require more math and statistics courses, however, this may result in fewer students declaring a major in economics and the department would not receive as many funds which would further limit the resources and opportunities that the department could pursue. This thesis will attempt to identify components from peer and aspirant institutions (PL 1-12) that would make for a stronger economic program, without losing students who are concerned that they will not do well in a more rigorous major, and provide more options for students who seek a challenging curriculum.

Methodology

Survey

Faculty Survey Data Description:

The first step in this analysis was to create a faculty survey. (Survey 1.1) The faculty survey was an informal survey that was sent out to the economics faculty at the approval of thesis adviser, Dr. Bill Curington. Responses were collected vial email messages and consolidated and analyzed by researcher Will Watkins. The survey questions asked to faculty members were:

1. In your experience as a faculty member at the Arkansas, what are some of the strengths of our curriculum and course offerings and what are some weaknesses that you have seen?
2. With regard to students, what areas do you think students are lacking in their economics coursework?
3. Do you see think this gap, if any, hinders how much course content you are able to cover in a typical semester? (For example, mathematical background like statistics and calculus.)

The results from this survey should be carefully considered as the faculty members who have responded have advanced degrees in economics or other related disciplines which require advanced mathematics and statistics. This quantitative background may influence the responses received from the faculty toward increasing quantitative requirements. Lastly, these results were used to develop a student survey with results shown below.

Faculty Survey Responses:

Complete faculty survey responses can be found in the appendix. (Survey 1.2) The responses were analyzed and organized by themes that became apparent in email exchanges with faculty members. These themes are summarized below by question asked.

1) In your experience as a faculty member at the Arkansas, what are some of the strengths of our curriculum and course offerings and what are some weaknesses that you have seen?

   a. Strengths: Behavioral and experimental economics coursework, research opportunity, engaged faculty, small class sizes, variety of elective offerings.

   b. Weaknesses: Mathematical/Quantitative rigor, lack of scientific method in coursework, disproportionate faculty instruction, traditional integrated curriculum, lack of additional electives (e.g. Game Theory, public policy, Government and the Economy)

2) With regard to students, what areas do you think students are lacking in their economics coursework?

   a. Mathematically deficient (8/8 responses)

   b. Incentivized to take and teach easier, less challenging courses (2/8 responses)

   c. Few offerings in "soft" econ courses that cover economics in public policy and government. (2/8 responses)

   d. Lack of motivation (1 response)

   e. Computer coding/programming courses (1 response)

3) Do you see think this gap, if any, hinders how much course content you are able to cover in a typical semester? (For example, mathematical background like statistics and calculus.)

   a. Faculty seem to have some consensus that lack of mathematical preparation affects how they are able to teach material. Generally, it seems like this deficiency changes the depth that they are able to teach the material not so much the amount of material or the number of topics they are able to teach.

Student Survey Data Description:

The student survey was a formal survey (Survey 2.1) sent out to undergraduate economics majors at the University of Arkansas with approval of the University of Arkansas Institutional Research Board. (Survey 2.3) The responses (Survey 2.2) collected from the faculty and student surveys serve as a guide in reviewing Peer and Aspirant Institutions degree plans. Student survey responses were collected via Qualtrics survey which included sections with questions on:

1. Survey Consent
   a. This section informed students of their rights as survey participants and follows IRB guidelines for an exempt student survey.
2. Demographic Questions
   a. This section asks students questions regarding their: Major, Minor, college of Enrollment, GPA, Classification, Honors College membership, Mathematics courses taken, and Economics courses taken.
3. General Economics Program Feedback

    a. This section asks students questions regarding their experience as an Economics major at the University of Arkansas, specifically focusing on the perceived difficult of the major, the number of students in upper level economics courses, economics courses available, and how well courses are publicized to economics students.
4. Quantitative Experience
    a. This section asks students to respond with how well the agree/disagree with statements about: the need for prior coursework in mathematics, difficulty of different mathematics courses, instructor's capacity to teach mathematics in economics courses, and familiarity with computational methods/skills.
5. Post-Graduation Plans
    a. This section asks students about plans post-graduation including: joining the workforce, attending graduate school, or other plans. This section specifically asks students who are joining the workforce what industry they are going into, their anticipated salary, and how qualified they feel about the positions they are accepting. Additionally, this section asks students who are attending graduate school what programs they are attending and whether they feel they have the qualifications to enter such a program.
6. Additional Comments
    a. This section gives student respondents the opportunity to give any additional feedback as well as provide a space for students to enter contact information for further questions as desired by the researcher.

Student Survey Responses:

Demographics of Student Respondents:

- Survey Responses (Survey 2.2)
- Total Number of Respondents:
    - 58 responses
- College of Enrollment:
    - 31% of Students are enrolled in the Fulbright College of Arts and Sciences
    - 62% of Students are enrolled in the Walton College of Business
    - 7% of students responded "no" to be an economics student and responses were not recorded.
- Classification
    - Freshman 18.52%
    - Sophomore 18.52%
    - Junior 24.07%
    - Senior 38.89%
- Majors:
    - The most frequently occurring double majors include:
        - Political Science (11%)
        - Finance (5%)
        - Supply Chain Management (5%)

- Minors:
    - The most frequently occurring minors include:
        - Business Analytics (10%)
        - Spanish (6%)
        - Behavioral Economics (5%)
        - Chinese (5%)
        - Finance (5%)
        - Legal Studies (5%)
        - Marketing (5%)
        - Math (5%)
- Honors College
    - Yes 62.96%
    - No 37.04%
- GPA Range:
    - Below 2.00 [0%]
    - 2.00-2.50 [0%]
    - 2.50-3.00 [1.85%]
    - 3.00-3.25 [9.26%]
    - 3.25-3.50 [9.26%]
    - 3.50-3.75 [27.78%]
    - 3.75-4.00 [51.85%]
- Average number of MATH courses taken?
    - The average number of hours of math coursework taken by respondents is 11.67

These demographics represent the 54 undergraduate economics students who responded to the survey. Of these demographics, the ones that should be given careful consideration are the Classification, Honors College, and GPA Range. Because the principle researcher is a senior and a Walton honors student, there is likely to be some response bias because the senior classification, Walton College, and honors college membership are the groups that the researcher has the most familiarity with. Additionally, the relatively large percentage of honors students who took the survey will skew the responses for GPA range as honors students are required to keep above a certain minimum GPA. These specific demographic groups must be considered when interpreting the results of the survey as these students are more likely to have taken challenging coursework or express their desire for coursework to be more difficult. Additionally, the major that most often appears as a double major in conjunction with economics is political science at 11% of the economics majors surveyed. The minor that most often appears in conjunction with the economics major is Business Analytics at 10% of the economics majors surveyed.

Because of these groups likelihood to influence the results from the quantitative and general program feedback sections of this survey, the responses from those sections will be analyzed: with no filtering, filtering with respect to honors designation, filtering with respect to GPA range, and filtering with respect to college enrollment.

- Economics Courses Taken:

    - The top six most frequently occurring courses that are taken by economics majors are (in order): Principles of Macro, Principles of Micro, Microeconomic theory, Macroeconomic theory, Introduction to Econometrics, and Economics of Organizations. These course percentages align with the courses that are required to graduate with an economics degree in either the Fulbright college of Arts and Sciences or the Walton College of Business.
- Math/Statistics Courses Taken:
    - The top three MATH courses taken by economics majors are (in order): Finite Mathematics, Calculus 1, and Survey of Calculus.

General Economics Program Feedback:

- As a student in the economics program, do you feel that there are too many students who are not majoring in economics that are enrolled in upper division/elective economics courses?
    - Yes [33%]
    - **No [67%]**
- Did you take any of your math courses (Finite, Calculus, Stats, etc.) at an institution other than the University of Arkansas?
    - **Yes [52.46%]**
    - No [47.54%]
- If you answered "Yes" to the previous question, did you take the class in-person (face-to-face) or online?
    - **In-person [71.88%]**
    - Online [28.13%]
- If economics courses were more mathematically challenging would you consider a different major?
    - Yes [32%]
    - **No [68%]**
- If you answered "Yes" to the previous question, what major would you consider changing to?
    - Of the students who selected that they would consider switching majors, the top five majors were: Marketing (33%), Finance (11%), Journalism (11%), Management (11%), and Supply Chain Management (11%).
    - Table 1
- Do you feel that you know what types of courses/topics in economics (outside of required courses for a major or minor) you would like to take?
    - **Yes [72%]**
    - No [28%]
- Do you feel that the University of Arkansas economics department is lacking course offerings or topics? (Ex: Game Theory, Behavioral Economics, Advanced Econometrics, Managerial Economics, Industrial Organization, Economic Modeling, etc.)
    - **Yes [62%]**
    - No [38%]

- If you answered "Yes" to the previous question, what course topics do you think should be offered?
    - Of the students who responded that they knew the types of economics courses they would like to take, the most frequent courses that were mentioned are (in order): Game Theory (39%), Economic Modeling (24%), Additional Behavioral Economics (15%), and Advanced Econometrics (12%). Of the courses listed, Arkansas offers: Behavioral Economics and Advanced Econometrics (which may be taken as Graduate level coursework). Game Theory and Economic Modeling do not have a specified class that students are currently able to take, however, concepts of Game Theory are taught in Economics of Organizations and concepts of Economic Modeling are taught in Introduction to Econometrics and Forecasting.
    - Table 2
- Do you feel that in your experience as an economics major that you are aware of courses available to you?
    - **Yes [67%]**
    - No [33%]
- Do you feel that elective courses in the economics program are well publicized to students majoring in economics?
    - Yes [23%]
    - **No [77%]**

Quantitative Experience:

Regarding their quantitative experience, students are neutral. Regarding Algebra and Statistics, students generally disagree that it is difficult. With regard to Calculus 1, students are generally neutral. With regard to Calculus 2, Calculus 3, Linear Algebra and Differential Equations, students generally agree that this is/would be difficult. These four courses have been taken by 27%, 13%, 6%, and 11% (respectively) of the total number of respondents for this survey. The low enrollment rate for these courses may be the primary reason for these courses' perceived difficulty. (Table 3)

Additional analysis was conducted to determine the perceived difficulty of Calculus 1, which is one of the most commonly taken math courses among survey respondents. Respondents who took any previous math coursework at another institution via an online class had a 60% response rate that they agreed or strongly agreed that Calculus 1 is/would be difficult. (Chart 1) Students who took any previous math coursework at another institution but took the class face to face, had a 36% response rate that they either agreed or strongly agreed that Calculus 1 is/would be difficult. (Chart 2) Lastly, students who took any previous math coursework at the University of Arkansas only had a 35% response rate that they either agreed or strongly agreed that Calculus 1 is/would be difficult. (Chart 3) Similarly, students who take math at another institution besides Arkansas had a 52% response rate that they either agreed or strongly agreed that they felt prepared mathematically for economics coursework at Arkansas. (Chart 4) Students who took math coursework at Arkansas had a 61% response rate that they either agreed or strongly agreed that they felt prepared mathematically for economics coursework at Arkansas. (Chart 5) In effect, this gives some support for requiring

students to complete their math coursework at the University of Arkansas instead of through another institution.

Block 1 questions concern questions regarding the use of mathematics in economics coursework. (Table 4) Legend for Table 4 can be found in (Table 6). Students generally agree they are mathematically prepared for economics coursework at the University of Arkansas. Students are generally neutral about taking an easier course that they might do well in versus a more difficult course they might not be as successful in. Additionally, students are generally neutral regarding their instructor's ability to explain topics requiring mathematics. Students are generally in consensus that economics requires a foundation of mathematics and that economics courses at the University of Arkansas could be taught using more math. The only question that students generally disagree with is that economics instructors teach content with too much emphasis on mathematical ability, or to say that there is not an emphasis on using mathematics in economics courses.

Block 2 economics questions also involve the use of mathematics in economics coursework, but also focuses on the usefulness of mathematics in economics as a discipline and student's quantitative ability to build and interpret mathematical/statistical models. (Table 5) Legend for Table 4 can be found in (Table 6). Students generally agree that they would have a better understanding of content in economics courses if required to take more math courses, but too much time has passed between their last math class and the upper level courses that require math. Students also agree that a coding and/or computational course would be beneficial to their economics education and would add value to their skill-set when applying for jobs or graduate school. Additionally, students generally agree that they are comfortable interpreting results from a mathematical/statistical model. Next, students are generally neutral that upon declaring a major in economics they understood the level of math that would be required in upper-division courses. This may be primarily due to the fact that most lower-division courses in economics do not require much math past basic algebra so underclassmen may not have an entirely accurate picture of the level of mathematics that is required in upper division courses. Finally, students generally agree that they are not comfortable coding or creating a mathematical model using many familiar statistical software/tools. Several of these software packages are taught very briefly in some economics coursework and largely depends on the professor for which package will be used. For example, R, EViews, and Stata have been used by different professors as a software aid in Introduction to Econometrics and Forecasting.

Post-Graduation Plans:

- Are you planning to enter the workforce upon graduation?
  - **Yes [67.86%]**
  - No [32.14%]
- If you are planning to enter the workforce upon graduation, what is your intended industry of employment? (Ex: Financial Services, Government, Consulting, Non-profit, etc.) If you are not planning to enter the workforce upon graduation, please respond N/A.

    - Of the students who responded "yes" to entering the workforce upon graduation, the most frequently occurring industries of employment are: Financial Services (8), Consulting (7), and Government (6). (Table 7)
- If you are planning to enter the workforce upon graduation, what is your expected salary? (Please only answer if you have accepted a position and know your starting salary, otherwise please respond N/A)
    - The Expected Salary of graduating seniors who are entering the workforce after graduation is shown in Chart 6, the mean salary for these students is $62,250.
    - This figure is on that may have some influence by honors students who took the survey as the average salary of graduating honors students who took this survey is $66,700 which is well above the average of all graduating seniors who took the survey.
    - Additionally, some response bias could be present as the students who took this survey are likely to be high achieving students, as evident by the high percentage of students with a GPA above 3.5.
- If you are planning to enter the workforce upon graduation, do you feel that your current quantitative skill-set excludes you from positions that you would like to apply for?
    - **Yes [59%]**
    - No [41%]
- Are you planning to attend graduate school upon graduation?
    - Yes [49%]
    - **No [51%]**
- If you are planning to attend graduate school upon graduation, what is your intended graduate program?
    - Of seniors who are graduating and attending graduate school after graduation, the top graduate programs (in order) are: Law School, Economics, and MBA. (Table 8)
- If you are planning to attend graduate school upon graduation, do you feel that your current mathematical skill-set meets the requirements of the program for which you are applying/have accepted to?
    - **Yes [63%]**
    - No [37%]
    - Of the students who are entering Law School, 100% feel that their current mathematical skill-set meets the requirements of the program for which they are applying/have accepted to. (Chart 7)
    - On the other hand, of the students who are entering a graduate Economics program, 100% of students feel that their current mathematical skill-set does not meet the requirements of the program for which they are applying/have accepted to. (Chart 8)
- If you answered "No" to the question above, what mathematical coursework are you lacking? Ex: Linear Algebra, Calculus, Differential Equations, Programming coursework, etc.

    - The coursework that has the highest frequency among student responses is Differential Equations (32%), Linear Algebra (26%) and Programming (21%). (Table 9)
- Do you have any other plans that do not include entering the workforce or attending graduate school after graduation?
    - Yes [10.91%]
    - **No [89.09%]**
- If you answered "Yes" to the question above, what are your plans for after graduation?

Post Grad:
Return home to teach
Potential research opportunities before entering grad school
Peace corps
Waiting to hear back on a Fulbright grant (teaching English abroad for 1 year)
Gap year to be a consultant for my sorority
Studying classical Arabic for religious reasons

Additional Comments:

- If you have any additional comments, remarks, or input that was not otherwise covered in this survey please describe below. If none, please respond N/A
    - Of the additional comments that were collected: (Table 10)
        - Four out of the twelve responses (33%) had some mention of not having sufficient skills for applied economics positions post-graduation.
        - Two out of the twelve responses (25%) had some mention of taking more mathematics courses.
        - Two out of the twelve responses (17%) had some mention of lacking math requirements to enter graduate school.
        - One response out of twelve (9%) had a mention of professors having more diverse research interests.
        - One response out of twelve (9%) had a mention of creating economics honors organization.
        - One response out of twelve (9%) had a mention of being interested in the results of this thesis.

Degree Comparison Dataset Description:

The second step to analyze the Arkansas Economics program is to identify components from peer and aspirant institutions (P/A) to integrate with the existing degree plan at the University of Arkansas. Feedback from the student and faculty surveys will guide the benchmarking process. The method used is a qualitative review of P/A institutions and the economics degree plans offered to undergraduate students. The P/A institutions used in this analysis were determined by the Walton College of Business Executive Committee and reflects the committee's collective knowledge of the programs at these schools and their reputation relative to the Walton College, these are the first institutions that are reviewed when the college benchmarks a topic. (PA 1)

The peer and aspirant institution degree plans were found on the respective university's economics website. Degree plans of the same type (B.A., B.S., B.S.B.A. etc.) were then grouped by peer and aspirant institutions and the individual course requirements were listed for each university. Additionally, any courses that were unique to a specific institution were noted and course offerings that are optional or alternatives are noted using filled in cells of the same color corresponding to the offerings that are alternatives for one another. (PA 1-21)

Peer and Aspirant Institutions Degree Comparison:

The Peer institutions for this analysis are:

- University of Kentucky, Gatton College of Business and Economics
- Louisiana State University, E.J. Ourso College of Business
- University of Missouri- Columbia, MU College of Business
- University of South Carolina, Moore School of Business
- University of Oklahoma, Price College of Business
- University of Tennessee at Knoxville, College of Business Administration

The Aspirant Institutions for this analysis are:

- University of Florida, Warrington College of Business Administration
- University of Georgia, Terry College of Business
- Indiana University- Bloomington, The Kelley School of Business
- University of Maryland, Robert H. Smith School of Business
- Ohio State University, Fisher College of Business
- University of Texas- Austin, McCombs School of Business

Peer Institution Benchmarking:

Peer Institution Benchmarking was done with the basis for comparison being the University of Arkansas degree plans. Early review showed that peer and aspirant institutions often had different names for very similar courses, as shown by investigating course descriptions. These discrepancies were consolidated to the most frequently occurring names. Any courses that were unique to a particular institution retain the name of the course and a designation for its respective institution. This analysis specifically focuses on the core degree requirements for an economics major and does not include the university or general requirements that all students must take.

Bachelor of Arts (BA):

Peer institutions that offer a BA degree are: University of Kentucky, Louisiana State University, University of Missouri- Columbia, University of Oklahoma, University of South Carolina, and University of Tennessee- Knoxville. (PA 2)

The course information on its own may be somewhat misleading without further explanation. Beginning with economics requirements, the Introduction to Econometrics Course, University of Tennessee-Knoxville and University of South Carolina require this course to be taken where this course is considered an alternative to Introduction to Probability and Statistics at the University of Missouri-Columbia. In comparison with the University of Arkansas BA requirements, Introduction to Econometrics is seen as an alternative in a three-course sequence that also includes Forecasting and History of Economic Thought. The next course requirement that has a low percentage is Forecasting (a course that teaches methods for analyzing time series data) which is required at the University of Missouri-Columbia, however, this course is also an alternative to a Probability and Statistics 2 course. This further explains the low percentage of institutions that require a Probability and Statistics 2 course. History of Economic Thought is the next lowest requirement percentage, where the University of Arkansas is the only institution that requires a History of Economic Thought course in its BA curriculum. A senior capstone/seminar in economics is the next lowest requirement percentage where the University of Kentucky and the University of Oklahoma require a senior capstone/seminar course in economics. Money, Banking, and Macroeconomic Activity is a course that is only offered by Louisiana State University and is a prerequisite course to Intermediate Macroeconomics. Lastly, no peer institutions require a Departmental Writing or Thesis requirement, Arkansas comparatively requires a departmental writing or thesis requirement.

Finite Mathematics is the next course where the only institution that specifically outlines Finite Mathematics as a requirement for the degree is the University of Kentucky. The University of Arkansas also outlines Finite Mathematics in conjunction with Calculus 1, however, this course can also be substituted for a sequence of Calculus 1 and Calculus 2. Business Statistics is the next course on the listing that has a low requirement percentage where it is only required by the University of Kentucky. At the University of Arkansas, Business Statistics (Data Analysis and Interpretations) is an alternative to taking an Introduction to Probability and Statistics course. All institutions that offer a BA degree plan only require an Introduction to Probability and Statistics course, or in Arkansas' case is an alternative to taking a Business Statistics Course. Louisiana State University is also the only institution to require College Algebra as a requirement, however, this is also the only prerequisite to taking Calculus 1. Lastly, the University of Oklahoma is the only peer institution that requires all of its students to take a sequence of Calculus 1 and Calculus 2 or Business Calculus 1 and Business Calculus 2.

In reviewing the average number of economics electives that are required by the different institutions, the primary cause of the variation between the number of hours required is the number of core requirements of the economics program. This can be seen in programs like University of Tennessee-Knoxville which requires 21 hours of economics electives but does not require any additional courses outside of introductory econometrics and the required math courses. The University of Arkansas, on the other hand, only requires 12 hours of electives but requires students to take an additional core course, write a departmental thesis, and complete finite mathematics. The total number of courses that include free electives and additional core requirements adds to a total of 21 hours of instruction.

Bachelor of Science (BS):

Peer institutions that offer a BS degree are: the University of Missouri-Columbia, and the University of South Carolina. (PA 3)

The University of Missouri-Columbia and the University of South Carolina differ greatly in terms of the BS course requirements offered at each. The University of Missouri offers two additional BS "tracks" that are not included on this list; due to the extensive, and similar nature of the tracks they have been included in the unique offerings (PA 8- Applied) (PA 9- Quantitative) section below. An important consideration is that the University of Arkansas currently does not offer a BA degree in economics.

In economics requirements, these two programs first show a difference where the University of Missouri requires a Quantitative Economics course, this course is essentially an introduction to the mathematical language used in economics and includes topics such as: linear models, matrix algebra, rules of differentiation and comparative static analysis, optimization. The second difference between the two programs is that the University of Missouri requires a senior capstone course and a senior writing requirement, where the University of South Carolina does not have these requirements.

Quantitatively, the first difference between the two programs is that the University of Missouri requires students to take Linear Algebra (known as Matrix Theory at UM), Calculus 3, one additional semester of Probability and Statistics courses (for a total of two semesters), and lastly requires an upper-level elective in mathematics from a specified list (see lightly highlighted yellow cells above). One difference that South Carolina has with the University of Missouri is that it requires a General Applications Programming course. The primary difference between the requirements is that the University of Missouri allows for students to use university core requirements to fulfill degree requirements, this is seen in the Missouri Degree plan where Calculus 1, 2, and 3 are all completed under the Math and Science core requirements.

While both programs are demanding quantitatively than the BA degree requirements from above, it is obvious that the University of Missouri has much more rigorous quantitative requirements than the University of South Carolina.

Bachelor of Science in Business Administration (BSBA/BBA):

Peer institutions that offer BBA or BSBA degrees are: University of Kentucky, Louisiana State University, University of Missouri-Columbia, University of Oklahoma, South Carolina, and University of Tennessee- Knoxville. (PA 4)

The BBA/BSBA section is the first occurrence of economics degrees being offered with business requirements. These degree plans still require a similar foundation to the BA and BS degrees where Principles of Micro/Macro and Intermediate Micro/Macro are required. However, there are still some differences between institutions and the economics courses they require.

In the economics coursework, the first discrepancy is where the University of Arkansas requires a course called Economics of Organizations, which covers: "game theory and contract theory to analyze the role of information and incentives within and between firms, and the boundaries of firms, integration and outsourcing, authority and incentives, and alternative organizational structures in an evolving business environment." (UA Course Catalog) The University of Arkansas is the only institution to require some sort of game theory-based course

in a BSBA/BBA degree plan. The University of Arkansas and the University of South Carolina are different from other institutions in requiring some sort of Introduction to Econometrics coursework. The University of Kentucky is the only program to require a senior seminar/capstone course. The next difference between programs is a Money, Banking and Macroeconomic Activity course that is offered at Louisiana State University and the University of Missouri, this course appears to be somewhat redundant because it is a prerequisite to Intermediate Macroeconomics and is not offered at any other institutions. The University of Arkansas has fewer economics electives, but instead requires students to take Econometrics and Economics of Organizations.

The next major section of this degree type is the inclusion of business courses. These institutions all require: Public Speaking (except for University of Missouri), Accounting 1, Accounting 2 (except for University of Arkansas which has Business Foundations as an alternative to Accounting 2), Introduction to Management Information systems, Introduction to Management, Introduction to Marketing, and a Strategic Management/Business Capstone Course. Another difference between the University of Missouri and other programs is that the University of Missouri requires three management courses (Introduction, Intermediate, and Advanced) which are not required at other institutions. However, the University of Missouri does not require its business economics students to take a principles of finance course or a course in public speaking. The last few differences between these programs are: a business writing requirement at the University of Missouri and the University of Oklahoma, an internship requirement at the University of Missouri, and a business ethics course that is required by the University of Oklahoma. Finally, the difference in economics and business electives seems to be primarily determined by the number of courses required in the economics and business core. On business electives, the University of Oklahoma has fewer required business electives, but has more requirements that are the same for all business majors, such as Business Ethics and Calculus 2.

Quantitatively, the first difference in required courses is Finite Mathematics which is required at the University of Arkansas, Kentucky and Missouri. As with previous degree types, Business Calculus 1/Calculus 1 are required at all institutions for the BSBA/BBA degree type. The next difference is the requirement of Business Calculus 2/Calculus 2 at the University of Oklahoma, this might be a positive difference between it and other comparable institutions. The primary differences between the different programs is in mathematics requirements where all institutions require some form of a Probability and Statistics class (except for the University of Arkansas which only requires a Business Statistics course). The University of Missouri has more rigorous requirements in statistics by having Probability and Statistics 2, however the University of Missouri and the University of Oklahoma do not require students to take a Business statistics course where all other institutions require a Business Statistics course. This difference in the University of Oklahoma not requiring a business statistics course is likely due to the additional requirement for Calculus 2 that is not required by other institutions.

While these degree plans require courses in the business college, there still exist several programs that have a more quantitative focus than others. The first institutions are the University of Arkansas and University of South Carolina that requires economics student to take either Introduction to Econometrics (or Forecasting at Arkansas). The second institution is the University of Oklahoma that requires business students to take Business Calculus 2/Calculus 2

regardless of major. The last institution that has a more quantitative focus is the University of Missouri which requires students to take two semesters of Probability and Statistics courses.

Bachelor of Science in International Business or International Trade:

Peer institutions that offer a BSIB degree or some sort of International equivalent are: University of Kentucky and Louisiana State University. (PA 5)

This degree comparison is difficult to describe with these universities. To better highlight the differences between these programs each will be described separately.

The University of Arkansas International Business Economics degree shares many similarities with the Business Economics (BSBA) degree in the section above. The primary difference between the two is the number of economics electives a student is required to take. International Trade and International Macro and Finance are specified in the requirements; however, these really only replace six hours of credit that existed in the BSBA degree plan. The next major difference is in the number of business electives that a student is required to take where BSIB students can take six hours of electives as compared to twelve hours in the BSBA degree. Additionally, BSIB students are required to take 9 hours of specified International Business courses. In addition to these Business/Economics requirements a student is required to complete 15 hours in Foreign Language coursework that may include: upper division foreign language courses, a minor in a foreign language, or select upper division courses related to a specific foreign language.

The University of Kentucky, unlike the University of Arkansas does not offer a BSIB in Economics. The primary difference between Arkansas and Kentucky is that students are not required to take business coursework and instead declare a BA degree in some foreign language in addition to a BS degree in economics. Students in this degree plan will instead take more courses in the University Core to fulfill a BS degree in economics and a BA in a foreign language.

Louisiana State University is more similar to the BSIB program at the University of Arkansas in business course requirements. The primary difference is that students are required to take the Money, Banking and Macroeconomic Activity course (which is a prerequisite to Intermediate Macroeconomics), and an International Politics course. Because of these additional requirements fewer electives are required for International Business electives. Another major difference between the BS degree offered at LSU and the degrees offered at Arkansas and Kentucky is that students at LSU are not required to take coursework in a foreign language.

Peer Institution- Unique Degree Plans, Concentrations, or Minors:

University of Arkansas:

Behavioral Economics: (PA 6)

The University of Arkansas offers a Behavioral Economics minor which cannot be found at any Peer or Aspirant Institution and is a unique offering to students at the University of Arkansas. This offering and the faculty who teach the Behavioral Economics minor courses add a tremendous value to the economics program.

Financial Economics: (PA 7)

The Financial Economics minor is typically an attractive minor for students who are majoring in Finance or Accounting because of the overlap in course requirements with major requirements for those degrees.

University of Missouri- Columbia:

Bachelor of Science Applied Economics Track: (PA 8)

The University of Missouri offers a Bachelor of Science in Economics with three distinct tracks. The first is a standard BS degree type as seen above, however, there exists Applied and Quantitative Economics tracks. The applied track, as seen above, requires fewer courses in mathematics, as seen by how the highest level of mathematics required is Finite Mathematics and Calculus. This track has fewer requirements but allows students more flexibility in exploring other course offerings like: Computer Science, Information systems, Accounting, Finance, Math, Statistics, or other STEM courses.

Bachelor of Science Quantitative Track: (PA 9)

Unlike the Applied track described above, this track is much more mathematically rigorous. The first real difference between the applied track and the quantitative track is that students in this track are only required to take one course in econometrics. Mathematically, this track is more rigorous by requiring: Calculus 1, Calculus 2, Calculus 3, Linear Algebra, two semesters of advanced statistics coursework, and one course in an advanced math elective. This track still allows students to take twelve hours of economics coursework in addition to one complementary elective.

Despite having a rigorous math requirement, this track gives students more choice in selecting mathematics coursework than the BS degree without a track.

University of Kentucky:

Bachelor of Arts in Mathematical Economics: (PA 10)

The main purpose for offering a mathematical economics degree plan is for students who desire to enter a more quantitative career path or attend graduate school for mathematics, economics, finance, or operations research. This degree type is very similar in nature to the University of Missouri BS Quantitative track, and requires students to take Calculus 1-4, Linear Algebra, three semesters of statistics courses, and finally one of three math sequences. This degree type doesn't offer students as much choice in mathematics and economics coursework, however, this degree plan gives students quantitative skills that are in high demand.

Bachelor of Science in Mathematical Economics: (PA 10)

The difference between the BA and BS degree options are the number of math and science electives that the student is required to take where the BA degree option doesn't specify Math/Science electives under the university core requirements for a BA degree.

Louisiana State University:

Empirical Economic Analysis Concentration: (PA 11)

This sequence of courses is designed to "provide economics majors with skills in analyzing business and economic data to solve real world problems" according to the LSU

economics department website. Among peer institutions this is the most quantitatively rigorous economics coursework option that is available to students. Many programs, even programs that have substantial quantitative requirements, only require students to take Introduction to Econometrics or some other alternative course. However, this sequence of courses offered through LSU give students experience in statistical methods used in cross-sectional, time-series, and panel data. Courses that are most like these at the University of Arkansas are: Introduction to Econometrics, Forecasting, and the graduate level Econometrics sequence.

University of Oklahoma:

Accelerated Bachelor of Arts and Master of Arts in Managerial Economics with Big Data Emphasis: (PA 12)

This is a unique program offering that is designed to be completed in one or two years (depending on part-time/full time status) and provides rigorous training in economics and data analytics. Applicants for this program must be in their junior or senior year of an economics degree in the College of Arts and Sciences to qualify.

This program offering is likely to be an attractive offering to students who aspire to get a master's degree but are concerned about being able to return to school after working, there are some similar programs at Arkansas such as the Master of Accounting which integrates coursework from Undergraduate and Graduate programs to fulfill graduate degree requirements. A similar program for Economics might also be attractive for prospective students and undergraduate economics majors.

University of South Carolina:

Business Analytics Concentration: (PA 13)

The University of South Carolina developed this program because of conversations with industry partners that described a need for individuals with business skills and an understanding of new analytical techniques. (S. Carolina) This program is not entirely different from the Arkansas minor in Business Analytics. The program offered at South Carolina is somewhat similar in the elective offerings by including technical classes from a variety of departments. The University of Arkansas program appears to be more rigorous by the total number of hours that are taken, and the type of courses taken. At Arkansas students go through a sequence of Business Analytics courses that are offered through the Information Systems department. This sequence of courses introduces students to business analytics, visualization, systems, machine learning, and data mining which are then used in a capstone seminar course where students work with real business problems and solutions are presented to company management. In addition to this sequence, students can select six hours of electives from several different departments. Due to the variety of offerings, students are usually able to take courses that overlap with their major requirements.

Aspirant Institution Benchmarking:

Like peer institutions, Aspirant Institution Benchmarking was done with the basis for comparison being the University of Arkansas degree plans where appropriate. Also like peer institutions, aspirant institutions often had different names for very similar courses, as shown by investigating course descriptions. These discrepancies were consolidated to the most frequently occurring names. Any courses that were unique to a institution retain the name of the course and

a designation for its respective institution. This analysis specifically focuses on the core degree requirements for an economics major and does not include the university or general requirements that all students must take.

Bachelor of Arts (BA):

Aspirant institutions that offer a BA degree are: The University of Indiana-Bloomington, Ohio State University, University of Florida, University of Georgia, University of Maryland, and The University of Texas- Austin. (PA 14)

In comparing required courses, these aspirant programs are somewhat similar in their program offerings. These programs require students to take Principles of Micro/Macro and Intermediate Micro/Macro. The first real difference between these programs is the requirement for Econometrics. The two institutions that do not require econometrics are the University of Florida and the University of Georgia. In addition to this the University of Maryland requires students to take one course in a series of options that include: Introduction to Econometrics, Forecasting, Game Theory, Mathematical Economics, or Economics of Cost-Benefit Analysis. The next difference is with the Ohio State University where students are required to take either History of Economic Thought or complete a departmental writing requirement. The only programs that require a departmental writing requirement are the Ohio State University and the University of Georgia.

These programs, like the peer institutions have a broad spectrum of the number of required economics electives. Indiana for example only requires three economics electives, however, students are required to select a track/concentration which pushes the total number of electives to 12 hours. Ohio State requires 15 hours of electives, but also does not require its students to take Calculus. The University of Florida and the University of Georgia only require 12 hours of economics electives but are also lacking in course requirements like Econometrics compared to other aspirant institutions. On the other hand, the University of Maryland requires 18 hours of electives from its students and still requires a choice from a list of quantitative courses. Lastly, the University of Texas only requires 9 hours of economics electives, however, this is supplemented because students are required to choose an option of either Calculus 1&2 or Calculus 2&3.

Quantitatively, the first difference is with Ohio State which differs from the other programs in this group because it does not require its students to take Calculus 1 and instead requires all students to complete College Algebra. The next difference is with Indiana University which specifically requires its students to take Finite Mathematics for the degree plan. Finally, the only institution with mathematics requirements beyond that of Calculus 1 is the University of Texas at Austin which requires students to complete either Calculus 1&2 or Calculus 2&3.

Bachelor of Science (BS):

Aspirant institutions that offer a BS degree are: the Ohio State University and the University of Maryland. (PA 15)

The Ohio State University and the University of Maryland are nearly identical in program requirements for a Bachelor of Science in Economics as they both require courses in: Principles of Micro/Macro, Intermediate Micro/Macro, Introduction to Econometrics, Forecasting, Calculus 1, Calculus 2, and an Introduction to Probability/Statistics Course.

The main differences between these programs is that Ohio State requires students to complete a senior writing requirement where the University of Maryland does not. The next difference is that the University of Maryland requires students to complete either Advanced Microeconomics or Advanced Macroeconomics.

Despite these courses requiring Calculus 1, Calculus 2, and a Probability/Statistics course, they are still relatively behind offerings from peer institutions like the University of Missouri.

Bachelor of Science in Business Administration (BSBA or BBA):

Aspirant institutions that offer a BSBA/BBA are: the Ohio State University and the University of Georgia. (PA16)

The Ohio State University and the University of Georgia are very similar in their requirements for a Bachelor of Business Administration. Both institutions require: Principles of Micro/Macro, Intermediate Micro/Macro, 12 hours of economics electives, Calculus 1, Business Law, Accounting 1, Accounting 2, Introduction to Management Information Systems, Introduction to Management, Introduction to Finance, Introduction to Marketing, and Business Statistics.

These two programs do not differ in their economics core requirements. However, these two programs do not require students to take any sort of Introductory Econometrics class or Forecasting class, this is consistent with other programs BBA/BSBA degrees where students are not required to take Econometrics or Forecasting.

Reviewing the business core courses, there are several differences. The first of which is with the University of Georgia which requires students to take a Public Speaking course, and the Ohio State University does not. The next differences are that Ohio State requires students to take an Introduction to Supply Chain Management, a Business Capstone/Strategic Management course, a Business Ethics course, and a Computer Modeling and Problem-Solving course. On the other hand, the University of Georgia requires students to complete a business writing requirement and a predictive modeling and optimization course. Finally, because of these differences in course requirements the number of electives required differs slightly.

These programs also differ in their quantitative requirements where the University of Georgia requires students to complete pre-calculus in anticipation to Calculus 1, and a business statistics course. The Ohio State University requires students to take Calculus 1, Business Statistics, and instead of pre-calculus students take an Introduction to Probability and Statistics course in addition to the business statistics course.

These programs retain some quantitative requirements in their curriculum but are not as rigorous as some peer institutions programs which have more quantitative requirements.

Bachelor of Science in International Business or International Trade:

Aspirant institutions that offer a BSIB degree or some equivalent are: the University of Georgia. (PA 17)

The University of Georgia is the only aspirant institution to offer a BSIB degree, because of this the degree plan will be compared to the University of Arkansas. In overall program

structure these degree plans are not all that different. Both have economics core courses, business core courses, International Business course requirements, and a Foreign Language requirement.

The main difference between the UGA and Arkansas economics core courses is that UGA does not require students to take an Econometrics or Forecasting course. The next difference is where students at UGA are required to complete a senior writing requirement and therefore complete one less course than Arkansas in the international business coursework. The next main difference in economics coursework is that UGA students are required to take 9 hours of economics electives where Arkansas students are required to take 3 hours of economics electives, but are also required to take two more courses, Econometrics/Forecasting and International Macro and Finance, in their economics coursework than students at UGA.

The Business core is also similar but there are some differences. Students at both institutions are required to take: Public Speaking, Business Law, Accounting 1, Accounting 2, Introduction to Management Information system, Introduction to Management, Introduction to Finance, Introduction to Marketing, and a Business Capstone Strategic Management course. These programs differ slightly because business students at UGA are not required to take an Introduction to Supply Chain Management course where this is a requirement at Arkansas. One similarity between these programs is that they both require students to take an International Trade course. However, Arkansas has an additional requirement where students must take an International Macro and Finance course. These two programs differ in their International and Business Electives where students at UGA are required to take 9 hours of Business Electives and only 3 hours of international business electives where Arkansas students are required to take 6 hours of business electives and 9 hours of international business electives. This difference may be attributed to UGA where students are not required to take an Introduction to Supply Chain course which is required at the Arkansas.

Quantitatively, these programs are fairly similar in their math requirements where students are required to take both Calculus 1 and a Business Statistics course. However, students at Arkansas are also required to take Econometrics coursework which gives the program more quantitative coursework than UGA.

UGA and Arkansas are very similar in their requirements of students to pursue foreign language coursework. The main difference is that UGA students take 21 hours of foreign language courses and Arkansas students take 18 hours. This is primarily due to the allocation of business, economics, and international business required electives between the two schools. Additionally, Arkansas requires BSIB students to take an International Macro and Finance class which is not required at UGA.

These two programs are similar to one another, where the only real differences are in the economics and business/international business courses that are required. Since these programs only vary slightly, UGA would be considered a benchmark institution to Arkansas for the BSIB degree plan.

Aspirant Institutions- Unique Degree Plans, Concentrations, or Minors:

University of Indiana Bloomington:
Bachelor of Arts Concentrations: (PA 18)

Indiana has one of the more unique offerings of any aspirant Institutions in requiring students to declare a concentration within the economics major. Because of the variety of course offerings, students can declare concentrations in: Financial and Monetary Economics, International and Development Economics, Economics of the Public Sector and Labor Markets, Strategic Interaction, and Advanced Computation/Econometric Tools. This outlines specific course offerings that will give students the tools and knowledge they need to enter a specific field of economics.

Indiana retains a similar structure that most economics programs have such as: Principles of Micro/Macro, Intermediate Micro/Macro, and Econometrics. This gives students the fundamental basis to succeed in economics coursework, but the addition of a concentration gives students a specific path toward a field of interest. A student's coursework is not entirely made up of the courses in the concentration as students are required to take one economics elective outside of the concentration requirements.

A structure like this might be easily imitated at Arkansas where some modifications could be made to make use of unique offerings in Behavioral/Experimental Economics.

Bachelor of Science Math and Economics Interdepartmental Major: (PA 19)

This degree offering, like the concentration offerings in economics are also unique to Indiana. Students can declare a BS degree in Economics and Mathematics by an interdepartmental degree. Economics students are still able to declare a specific concentration in economics, but students are not required to take as many courses, specifically Econometrics and Economics electives. These courses are made up where students are required to take more quantitative courses that include: Calculus 1-3, Linear Algebra, a Probability/Statistics course, and 2 courses from one of the math concentrations listed above. These math concentrations give students the choice to pursue more instruction in a specific field of mathematics. Available tracks include: Analysis, Differential Equations, Applied Math, and Probability/Statistics.

This program may appeal to students who are intending to pursue a graduate degree in Economics or another technical field. A program like this might be imitated at Arkansas by creating a degree in conjunction with the Math department to create more options for economics and math majors at Arkansas.

University of Georgia:

Bachelor of Arts Concentrations:

Public Policy Concentration: (PA 20)

Consulting Concentration: (PA 21)

These two economics concentrations require 12 hours of courses, like the concentrations at Indiana, these offer specific instruction in potential career paths in consulting and public policy. In fact, if this program was to be imitated at Arkansas, a student would be able to complete the concentration only using 9 hours of electives as Econometrics is a required course for both concentrations. This could fit in well with the existing Arkansas degree plan where students are already required to take 9 hours of economics electives.

The same idea goes for UGA as it does with Indiana where if this concentration was to be created at Arkansas it could be altered to include Behavioral and Experimental economics courses which are unique to Arkansas economics program.

Results

Faculty Survey Results:

Generally, these survey responses may not entirely reflect faculty opinion. This survey had eight responses from faculty, when there are twenty-two faculty members in the department for a total response rate of 36%. From the Faculty survey, responses indicate that the strengths of our program are in the variety of courses available, research opportunity, and engaged faculty. Weaknesses include: lack of additional course offerings, disproportionate faculty instruction, and lack of mathematical/quantitative rigor. Regarding student observations, faculty generally agree that students are mathematically deficient, are incentivized to take easier, less challenging courses, and have little access to additional economics coursework. Faculty have some consensus that when students lack mathematical maturity the depth of instruction is affected. From this faculty survey, there is some evidence to conclude that faculty believe the economics program is lacking in mathematics instruction and is also lacking in course offerings.

Student Survey Results (by hypothesis):

Considerations:

The faculty survey results were translated into the student survey where students were asked a number of questions regarding: their demographics, economics program feedback, quantitative experience, and post-graduation plans. This was done primarily to identify groups that might influence survey results, gain insight to student feedback regarding the economics program, students' quantitative experience as it relates to economics coursework taken, and determine any effect these might have on student's post-graduation plans. Generally, the survey responses did not accurately reflect the population of students who have declared an economics major. The total number of economics majors at the University of Arkansas is 593 students, but this survey only had 54 respondents for a total response rate of 9.1% (Table 11) freshman economics majors make up 45% of all economics majors, however, the number of freshman who took the survey was only 18% of all respondents. Sophomore and Junior respondents were fairly accurate, but senior economics majors made up 38% of the responses, despite only being 15% of the total undergraduate economics population at Arkansas.

Do the University of Arkansas undergraduate economics students believe the economics degree plan is lacking in mathematics instruction?

Of these respondents, the average hours of math coursework taken was 11.67 with the most frequently enrolled courses being: Finite Mathematics, Calculus 1, and Survey of Calculus. This frequency is primarily attributed to degree requirements where Finite Mathematics and Calculus 1 or Survey of Calculus are the highest math requirements for upper-level economics electives. Of the respondents, there is agreement that too much time has passed between the last math course taken and economics courses that require more math. Of the respondents, 52.5% recorded they had taken previous math coursework at an institution other than the University of Arkansas. Of the students who said they had taken previous math coursework at an institution other than the University of Arkansas, 72% of students recorded they had taken the course face-to-face, and 28% of students took the course online. Additional analysis was conducted to

determine the perceived difficulty of Calculus 1-- the highest required math for economics majors at Arkansas--which is also one of the most commonly taken math courses among survey respondents. Respondents who took any previous math coursework at another institution via an online class had a 60% response rate that they agreed or strongly agreed that Calculus 1 is/would be difficult. (Chart 1) Students who took any previous math coursework at another institution but took the class face to face, had a 36% response rate that they either agreed or strongly agreed that Calculus 1 is/would be difficult. (Chart 2) Of the students who took any previous math coursework at the University of Arkansas, only had a 35% response rate that they either agreed or strongly agreed that Calculus 1 is/would be difficult. This may be due to some sort of response bias where students who are more likely to take math at a different institution may also be more likely to perceive math as being more difficult. (Chart 3) Similarly, students who take math at another institution besides Arkansas had a 52% response rate that they either agreed or strongly agreed that they felt prepared mathematically for economics coursework at Arkansas. (Chart 4) Alternatively, students who took math coursework at Arkansas had a 61% response rate that they either agreed or strongly agreed that they felt prepared mathematically for economics coursework at Arkansas. (Chart 5) In effect, this may give some support for requiring students to complete their math coursework at the University of Arkansas instead of through another institution. Comparing students perceived preparedness for economics courses to faculty responses, students may feel slightly more prepared for economics coursework because faculty are not teaching material at an appropriate depth that would require mathematics. Additionally, students generally understand that studying economics requires a foundation in mathematics. (Table 4) Students have also signaled that economics coursework could be taught using more math. (Table 4) When asked if economics courses were more mathematically challenging, 32% of students say they would consider a different major. When asked what major they would consider changing to, the top responses were: Marketing, Finance, Journalism, Management, and Supply Chain Management.

Of the senior economics students who will be entering the workforce upon graduation, 59% say they feel that their current quantitative skill-set excludes them from positions they would like to apply for. Lastly, students who are pursuing graduate education 63% of students say their current mathematical skill-set meets the requirements of the program they are applying to/ have accepted. Of the students who said their skills do not meet the requirements of the program they are applying to/have accepted, the most frequently occurring courses they are missing are: Differential Equations, Linear Algebra, Programming, and Calculus. Delving into this response population, 100% of the students who are entering Law School say their skills meet the requirements of the program, where 100% of the students entering graduate Economics programs feel their skills do not meet the requirements of the program.

These results seem to corroborate the faculty survey responses that students are deficient in mathematics coursework. However, in considering the population of students whose intended career path does not include economics analysis or graduate school in economics, these students feel their quantitative skills meet the requirements of the program for which they are applying. These two different groups have very distinct needs and so one option that may be considered is to develop concentrations within the economics degree plan where students will be able to make an informed choice about the curriculum they take and the types of career paths that might follow.

Do University of Arkansas undergraduate economics students believe the economics degree plan is lacking in course offerings?

Of these student respondents, the most frequently occurring economics courses taken are: Principles of Macro/Micro, Micro/Macro Theory, Introduction to Econometrics, and Economics of Organizations. These courses are likely to have such a high enrollment rate because they are also the only courses which are specifically required in the economics degree plan. Of the other courses listed, students generally take these as electives.

Of the student respondents, 72% of students knew what types of courses they would like to take outside of the required courses, and 67% of students feel that they are aware of courses available to them. However, 77% of students responded that they feel economics courses are not well publicized to students majoring in economics. Additionally, 62% of students feel that the University of Arkansas economics department is lacking in course offerings or topics. Of the responses that said the economics department was lacking in course offerings or topics, the most frequently desired courses are: Game Theory (39%), Economic Modeling (24%), additional Behavioral Economics courses (15%), and Advanced Econometrics (12%). In order for courses like this to be beneficial to students, additional mathematics and computational courses must be added in order for a student to gain value from taking the course. Some evidence of this can be seen when students are asked if they were required to take more math courses [they] would have a better understanding of content in [their] economics courses to which there was agreement. (Table 5) Additionally, students agree that a computational course would be beneficial to their economics education and that they feel comfortable interpreting results from a mathematical or statistical model, however, students are not comfortable coding or creating a mathematical model in common statistical software such as: SAS, R, Python, EViews, Stata, Excel, MATLAB, Minitab, Mathematica, etc. (Table 5) In the additional comments section, one student says "I feel like the economics program has poorly prepared me for economic positions. I wanted to apply for a position at the Fed to be a Research Assistance in the economics department but I didn't have enough experience in math or the statistical applications they use (Stata and R) to realistically apply."

Of the students who indicated they would be joining the workforce upon graduation, the most frequently occurring industries are (in order): Financial Services, Consulting, and Government. Then of the students who indicated they would be attending graduate school upon graduation, the most frequently occurring programs are (in order): Law School, Economics, and MBA. In general, students agree that adding additional courses, specifically technical or theoretical courses, would be a benefit to their skill-set and would not preclude them from applying for more technical positions or graduate programs. If the economics program were to add more courses, considering the industries and graduate programs of interest to students may be an effective way to organize degree concentrations.

Peer and Aspirant Institutions Degree Comparison

Peer Institutions (by degree type):

Bachelor of Arts: (PA 2)

The University of Arkansas BA in Economics is competitive against other peer institutions in requiring students to take quantitative coursework in Econometrics or Forecasting, Finite Mathematics, Calculus 1, and Introductory Statistics. In many ways the University of

Arkansas leads peer institutions in requiring quantitative coursework in the BA degree. The University of Missouri is the only really comparable program in quantitative offerings, however, the University of Oklahoma requires students to take Calculus 2 in addition to Calculus 1 and drops the requirement for Finite Mathematics. While dropping a course entirely may not be an option for many students, creating an alternative for students to take Finite and Calculus 1 or Calculus 1 and Calculus 2 may be a viable option. Another component that might be of interest is adding a departmental capstone/seminar course in economics, a course like this is offered at Kentucky and Oklahoma.

Bachelor of Science: (PA 3)

The University of Arkansas does not currently offer a BS in Economics. The only two peer institutions that offer a BS degree are Missouri and South Carolina. In terms of quantitative difference, Missouri has the clear advantage. In addition to the standard BS degree student at Missouri can also declare a track in Applied Mathematics or Quantitative Mathematics which provide focused mathematics coursework in addition to a strong quantitative economics core. South Carolina does have a required general applications programming course that is of interest. Adding a course like this would supplement economics students' education by providing the foundation on which to learn different statistical programs to create economics models.

Bachelor of Science in Business Administration: (PA 4)

The University of Arkansas BSBA in Economics is extremely competitive in providing students a strong background in different business areas while retaining quantitative economics courses that many other peer institutions do not require. South Carolina is the only other comparable institution which also requires Econometrics coursework, however, the University of Arkansas requires students to take Economics of Organizations which teaches more applied microeconomic and game theory concepts to explain behavior of firms. The one apparent weakness is that the University of Arkansas allows students to choose between Accounting 2 or Business Foundations where other institutions do not have a course comparable to Business Foundations and instead require all business students to take Accounting 1 and 2.

Bachelor of Science in International Business or Equivalent: (PA 5)

The University of Arkansas again offers an extremely competitive BSIB degree as compared to Kentucky and LSU. The Arkansas BSIB degree gives students a strong foundation in a wide variety of business areas, economics core courses which include econometrics, foreign language and cultural proficiency, as well as providing courses with an international business focus. The University of Kentucky only offers a combined Economics and Foreign Language degree which is not comparable to the BSIB degree from Arkansas. LSU is more similar in course requirements but does not adequately prepare students in foreign language requirements.

Unique Offerings for Consideration:

University of Arkansas

Behavioral Economics Minor (PA 6), Financial Economics Minor (PA 7)

University of Missouri- Columbia

BS Economics Applied (PA 8) and Quantitative Tracks (PA 9)

Configuring a BS degree with a strong quantitative focus may attract more students who are majoring in mathematics or some other related technical discipline through the Fulbright College of Arts and Sciences

University of Kentucky

BA Mathematical Economics (PA 10)

This BA degree is comparable to the Missouri BS Economics degree in course offerings with slightly different structure where Kentucky requires students to select one of three math sequences which appear to have topics of Applied Mathematics, Quantitative Mathematics, and Statistics.

Louisiana State University

LSU Economic Analysis Concentration (PA 11)

This degree concentration is a more quantitative option for students majoring in any Economics degree type at LSU. This is essentially an introductory econometrics sequence (1,2,3) for undergraduate students.

University of Oklahoma

OU Accelerated BA+MA with Big Data Focus: (PA 12)

This accelerated BA+MA degree appears to be somewhat similar to the structure of the University of Arkansas IMAcc program which combines undergraduate and master's degree accounting requirements. A program like this may be attractive to students who aspire to get a Master's degree, but are concerned about being able to return to school after working.

Aspirant Institutions (by Degree type):

Bachelor of Arts:

Among aspirant institutions, the programs that Arkansas benchmarks the closest to are Indiana University, the Ohio State, University of Maryland, and the University of Texas- Austin. These programs are most similar in economics core offerings which require the Principles and Intermediate Micro and Macro sequence in addition to Econometrics or some other quantitative option. Additionally, every institution (except the Ohio State) requires students to take Calculus 1/Survey of Calculus and Business Statistics/Introduction to Probability/Statistics. The only institution with additional quantitative requirements is UT-Austin which requires students to take either Calculus 1 and 2 or Calculus 2 and 3. The university of Arkansas is very similar to these requirements, but also requires student to complete a departmental writing requirement where Ohio State is the only other institution to require student to complete a writing requirement. **(**PA 14**)**

Bachelor of Science:

Among aspirant institutions, only Ohio State and University of Maryland offer a Bachelor of Science in Economics. Again, the University of Arkansas does not offer a Bachelor of Science in Economics, so a direct comparison cannot be done. Comparing these programs to peer institutions, there is a large discrepancy between University of Missouri which has significant quantitative requirements. However, comparing these programs to South Carolina, the other peer institution which offers a BS in Economics, the program is very similar except where

the University of Maryland requires students to take Advanced Microeconomics or Macroeconomics. Of peer and aspirant institutions, the University of Missouri is far ahead of others in quantitative requirements. **(**PA 15**)**

Bachelor of Science in Business Administration:

Among aspirant institutions, only Ohio State and the University of Georgia offer a BSBA/BBA in Economics. These programs are fairly similar to one another as well as the offerings from peer institutions. In economics requirements, Arkansas is more rigorous by requiring Econometrics where Ohio State and Georgia do not. Quantitatively, Arkansas and Georgia both require Calculus 1 and a course in Statistics, however, Ohio State requires Calculus 1, Business Statistics and an Introductory Probability/Statistics course. In business requirements, Arkansas and Ohio State are more rigorous by requiring Public Speaking, Introduction to Supply Chain, and a Business Capstone/Strategic Management courses where the University of Georgia does not. Ohio State has some additional variation in requiring students to take Business Ethics and a computer Modeling/Problem solving course. Georgia has some slight differences as well in requiring students to complete a business writing requirement and a Predictive Modeling and Optimization course. (PA 16)

Bachelor of Science in International Business:

Among aspirant institutions, the only institution to offer a BSIB degree is the University of Georgia. This program is somewhat similar to the University of Arkansas in program structure. In economics requirements, Arkansas is more rigorous by requiring Econometrics where Georgia does not. Quantitatively, both programs require students to take Calculus 1 and Business Statistics. In business requirements, the main differences are that Georgia requires students to complete a senior writing requirement where Arkansas does not. Alternatively, Arkansas requires students to take Introduction to Supply Chain which is not a requirement at Georgia. Lastly, international business requirements are slightly different from one another. The biggest similarity is a requirement for students to have proficiency in a foreign language and an International trade course. The differences are primarily in the number of required international business electives which the University of Arkansas requires more hours. However, Georgia requires students to complete a study abroad or complete additional foreign language courses. Comparatively, these programs are very similar to one another. (PA 17)

Unique Offerings for Consideration:

University of Indiana

Bachelor of Arts Concentrations (PA 18)

Indiana has one of the more unique offerings of any aspirant Institutions in requiring students to declare a concentration within the economics major. Because of the variety of course offerings, students can declare concentrations in: Financial and Monetary Economics, International and Development Economics, Economics of the Public Sector and Labor Markets, Strategic Interaction, and Advanced Computation/Econometric Tools. This outlines specific course offerings that will give students the tools and knowledge they need to enter a specific field of economics.

Bachelor of Science Math and Economics Interdepartmental Major (PA 19)

This degree offering, like the concentration offerings in economics are also unique to Indiana. Students can declare a BS degree in Economics and Mathematics by an interdepartmental degree. Economics students are still able to declare a specific concentration in economics, but students are not required to take as many courses, specifically Econometrics and Economics electives. These courses are made up where students are required to take more quantitative courses that include: Calculus 1-3, Linear Algebra, a Probability/Statistics course, and 2 courses from one of the math concentrations listed above. These math concentrations give students the choice to pursue more instruction in a specific field of mathematics. Available tracks include: Analysis, Differential Equations, Applied Math, and Probability/Statistics.

University of Georgia

BA/BBA/BSIB Concentrations: Public Policy (PA 20), Consulting (PA 21)

These two economics concentrations require 12 hours of courses, similar to the concentrations at Indiana, these offer specific instruction in potential career paths in consulting and public policy. In fact, if this program was to be imitated at Arkansas, a student would be able to complete the concentration only using 9 hours of electives as Econometrics is a required course for both concentrations. This could fit in well with the existing Arkansas degree plan where students are already required to take 9 hours of economics electives.

Summary:

In summary, faculty and undergraduate students at the University of Arkansas agree that students are generally deficient in mathematics coursework. In considering the population of students whose intended career path does not include economics analysis or graduate school in economics, these students feel their quantitative skills meet the requirements of the program for which they are applying. However, for students entering a more quantitatively demanding program or job additional requirements in mathematics would be beneficial. In general, faculty and students appear to agree that adding additional courses, specifically technical or theoretical courses, would be a benefit to a student's skill-set. If the economics program were to add more courses, considering the industries and graduate programs of interest to students may be an effective way to prioritize the addition of course offerings. Lastly, for most degree options (B.A., B.S.B.A, and B.S.I.B.) Arkansas leads peer and aspirant institutions in quantitative requirements. However, the addition of a Bachelor of Science (B.S.) in Economics would likely be a welcome addition to the program for students who desire a more quantitatively rigorous program in order to successfully apply for an be accepted to graduate programs and careers with high quantitative requirements.

Conclusions

Based on the results above and research on peer and aspirant institutions, there are some components to other programs that should be considered in the economics program at Arkansas. Components are listed in the order of ease of implementation. First, develop better methods of marketing economics courses to students some possible methods may include: recruiting in Freshman Business Connections classes, marketing to Political Science students in the Fulbright College, and marketing to Physics, Math, and Engineering majors (specifically Industrial Engineering students). Current student/Alumni profiles would be incredibly useful for accomplishing this. Second, begin conducting exit interviews/surveys with graduating economics students to receive additional feedback on the economics program similar to what is done at the

University of Florida and build on the results found in this thesis. Third, increase the quantitative requirements of the current offerings to include Calculus 1 and Calculus 2 in addition to requiring statistics coursework. Fourth, create concentrations similar to what is offered at the University of Georgia, University of Indiana, and Louisiana State University. An outline of concentrations can be found in the table below. Finally, create a Bachelor of Science degree similar to what is offered at the University of Missouri with tracks in Applied and Quantitative coursework. An outline of a Bachelor of Science degree in addition to Applied and Quantitative tracks can be found below.

Completing these recommendations has the capacity to give students better quantitative backgrounds to be successful in upper-division economics courses. Additionally, organizing existing offerings into concentrations, adding new courses, and marketing current courses would give students more options and information to choose economics coursework that most closely aligns with their desired post-graduation plans, whether that be in the workforce or in a graduate program.

Prescription

Based on Indiana University, University of Georgia, Louisiana State University, and the University of Arkansas. This list may include courses that are not offered at the University of Arkansas, so if a similar course exists the course title/number may be listed. If a course has no appropriate substitute at Arkansas, the course description from the University of origin was given. A list of Economics concentration might include the following: Public Policy (PL 1), Consulting (PL 2), Financial and Monetary Economics (PL 3), International and Development Economics (PL 4), Economics of Public Sector and Labor Markets (PL 5), Strategic Interaction (PL 6), Advanced Computation/Econometric Tools (PL 7), Behavioral Economics (PL 8).

A Bachelor of Science Degree might look like the following: modeled after the Missouri BS program and includes math and economics courses that we do not offer and their appropriate substitutes at the University of Arkansas. The offerings are as follows: BS only (PL 9), Applied (PL 10), Quantitative (PL 11)

Course Development Priority List:

Understandably, not all these courses can be created or taught at once. This would ideally give the above concentrations and BS degree plans more course offerings without significantly straining departmental resources. In order to better prioritize these course additions, it is suggested the following courses be added in order of those that are most frequently occurring, some courses with higher frequencies were left out due to the specific nature of the courses. These courses have been starred in the appendix table, but a placeholder value was inserted to the list below to mark irregular course offerings similar to University of Arkansas Walton Honors Colloquium courses which have irregular topics that depend on the instructor. (PL 1-12)

The first five concentration courses to be developed are listed below, and the full results can be found in (PL 12):

- Economic Analysis of Law (4 occurrences in concentrations listed above)
- Industrial Economics (2 occurrences in concentrations listed above)
- Game Theory (2 occurrences in concentrations listed above)

- Undergraduate Seminar- Computational Methods in Econometrics (2 occurrences in concentrations listed above)
- Special Topics Courses (Course topics such as: Economics of Life-currently offered, History of Financial Crisis-currently offered, Environment, Education, Health, Urban, Growth and Development, Sports, Economic History of U.S., Soviet Economies in Transition, etc. These course topics should be created according to faculty teaching and research interests.)

<u>The priority order of courses to add a Bachelor of Science in Economics are as follows:</u>

- Quantitative Economics (3 occurrences)
- Writing Requirement (3 occurrences)
- Senior Seminar/Capstone (1 occurrence) -- Additionally, this course should be limited to only economics majors who will have a more consistent coursework background (i.e. Econometrics, Forecasting, etc.)
- Note: Economics courses are the only ones on the priority list as the Economics department does not have the authority to create courses in another department. Additionally, Courses listed as UA equivalents include many graduate level MATH, STAT, and ISYS courses which may need additional approval for undergraduate enrollment to occur.

This program recommendation would serve to make the University of Arkansas economics degree an intensely popular degree among other majors in the Walton College of Business. Increasing the number of students that declare an economics degree will make the economics department more competitive for funding, and increased funding can result in improved course offerings and additional faculty. By attracting qualified faculty and students, the University of Arkansas economics department has the potential to become a program that other institutions across the country would seek to model themselves after.

Appendix

Survey

Survey 1.1

Faculty Survey

1) In your experience as a faculty member at the Arkansas, what are some of the strengths of our curriculum and course offerings and what are some weaknesses that you have seen?

2) With regard to students, what areas do you think students are lacking in their economics coursework?

3) Do you see think this gap, if any, hinders how much course content you are able to cover in a typical semester? (For example, mathematical background like statistics and calculus.)

Survey 1.2

Faculty Survey

Responses Received (In order received)

Faculty Member 1

1) Our program has a course in behavioral economics which is not something that everyone has. Also, our university is small, and our faculty are engaged with students, and a student who is interested in taking advantage of that can really gain a lot. High-quality students have even done research with faculty members which is rare at most schools.

2) Our students are very deficient in mathematics, and the fact that our courses are not taking only by economics majors exaggerates that even worse. So we are not able to incorporate calculus in most of our upper division courses. As such, the biggest problem with our program is that a student coming at me prepared to succeed and graduate University. However, I believe that is the case that was institutions unless the student has been guided to take a significant amount of mathematics along the way.

3) I don't think it hinders the amount of material, but it hinders the depth at which we are able to do analysis. For most students going into industry, that probably is not a major drawback. I see the biggest problem with those going on to graduate school.

Faculty Member 2

1) Strength: increasing mathematical rigor. Weakness: lack of integration of scientific method into courses.

2) Mathematical preparation

3) Yes, absolutely.

Faculty Member 3

1) Strengths: The econ department seems to offer a highly accessible, personable experience for the diligent student.
   Weaknesses: There seems to be somewhat of a concentration among the faculty who --in terms of sheer numbers-- disproportionately face the students. Ie, 90% of classes (by student headcount) are taught by 10% of faculty.

   Also, I see fewer offerings of "softer" econ classes; those answering questions about the econ role in policy, government, etc.

2) I don't really kick the tires mathematically, but I generally think there is too little calculus, stats, and linear algebra for the serious econ student.

3) For me, not really. That said, I do think there are some important intuitions that come with mathematical training, even if they aren't being explicitly used in the moment.

Faculty Member 4

1) The main weakness of our curriculum is the lack of depth in courses that prepare students with strong math/stats aptitudes in the first two years.

2) It is a hard task, as students have a strong pushback against hard materials, and instructors are incentivized by the evaluation system to teach easier materials. I am not sure about peer institutions, which I suspect share the same weakness as ours.

3) Yes, it hinder significantly what I can cover in my course Econ 4743 Intro to Econometrics that you have taken.

Faculty Member 5

1) In my opinion, the curriculum was stronger when we had the non-traditional integrated curriculum. But it was replaced with the more traditional curriculum in the fall of 2013. I think it makes it harder for students to see how their discipline fits into business decision making. The strengths of our department are that we are big enough to offer a variety of electives, and for the upper level courses we keep class sizes small.

2) Regarding students, what areas do you think students are lacking in their economics coursework? Since I teach lower level courses, the biggest obstacles I see are:

   a. Lack of mathematical maturity or fear of anything quantitative,

   b. Lack of motivation. They don’t actually want to learn, but see the course as a meaningless hurdle that must be cleared.

   c. More interested in easy and fun rather than quality of content.

3) At the lower level, it influences the depth and how I approach the material rather than how many topics are addressed. In a system where your audience is unmotivated and part of my evaluation is based on student reviews of the course, it definitely limits my

willingness to teach the course in a rigorous way. I try to help motivate students, but I feel like I have to teach to the middle and only occasionally throw out nuggets that challenge the better students.

4) *Additional Comments:*

I have a big question for your regarding this project. How are you defining strength or success? Is it rankings? If so, we can best improve by figuring out which metric in the ranking formula can be most easily manipulated and directing resources there. Is success defined as graduation rate? If so, easier courses and more tutoring is the solution? Is success defined as our grads getting jobs? If so, stronger ties with local employers and mandatory internships is the answer. Is success defined as getting into selective graduate programs? If so, we need to require calculus and have more classes calculus based. Are we successful by increasing the size of PhD program? By increasing funding? How you define success or strength is going to go a long way in determining the solution you find.

Faculty Member 6

Responses from Faculty Member 6 did not follow the question format, so his comments have been added below.

Additional Comments:

I think the program should be much more quantitative. You should take econometrics at the beginning of the third year. You should take real analysis and linear algebra should be mandatory. You should take a coding class and/or a computational class. There should be a closer relation with the banking sector, where our student would get very good jobs and good salaries.

Faculty Member 7

1) Additional follow-up needed

2) Do I wish students would have more, e.g., statistical skills to read empirical papers and have a deeper understanding about research in dev. econ? Of course -- but their current background is adequate to have a reasonable grasp of basics intuitions behind development economics. But one can always hope for more.

3) In my experience teaching upper-level undergraduate development economics (ECON 3843), the median student seems to have adequate courses for my class. However, given that this is the only undergraduate development economics class, I adjusted the course materials to suit the students' background.

Faculty Member 8

1) I think that we have particularly strong offerings in behavioral/experimental economics and development economics. These are popular fields in both academia and industry. Unfortunately, with such a small department, we do not offer other electives that might be useful, e.g., there is no undergraduate game theory course.

2) Math, math, math. In addition, students often have wildly different preparation for courses and we do not have enough prerequisites for many courses (though there are often good reasons for the lack of pre-requisites).

3) I previously taught in Singapore. By virtue of very uniform training in secondary education, I could assume that all students were capable of doing simple differential calculus. This enabled me to cut my mathematics review and to spend less time on the math and more on the economic intuition. Often it is far simpler to work with a derivative than it is to work with a discrete approximation. For example, discrete formulas for elasticity are much more complicated than the continuous version.

Survey 2.1

Honors Thesis Student Survey

Q47 Consent.

University of Arkansas Consent to Act as a Research Subject Economics Experiment Sam M. Walton College of Business student, Will Watkins, is conducting a research study about the University of Arkansas Economics Program. The purpose of this research is to better understand the student perspective of the economics program and develop a recommendation for a more competitive program. You have been asked to participate in this study because you have declared an economics major either in WCOB or Fulbright College. Participating in this survey will take approximately 13 minutes. You will be asked multiple choice and free response questions regarding your demographics and economics program experience. If you have questions, comments, concerns, or need clarification on a question, please contact Principle Researcher, Will Watkins (wewatkin@uark.edu) or Faculty Advisor, Bill Curington (bcurington@walton.uark.edu). If, at any point, you are uncomfortable answering the questions, you reserve the right to leave the survey. If you have questions or concerns regarding your rights as a research participant, please contact the IRB coordinator, Ro Windwalker (irb@uark.edu). Your completion of the survey indicates your consent to use your responses in this research. Participation in this survey is voluntary and refusing to participate will not adversely affect any other relationship with the University or the researchers. If you agree to participate in this study, please select "yes" below.

- Yes (1)
- No (2)

Q44 Are you an Economics major in either the Walton College of Business or the Fulbright College of Arts and Sciences?

- Yes (Walton College of Business) (1)
- Yes (Fulbright College of Arts and Sciences) (2)
- No (3)

Skip To: End of Survey If Are you an Economics major in either the Walton College of Business or the Fulbright College of A... = No

Q1 Select your classification from the list below:

- Freshman (1)
- Sophomore (2)
- Junior (3)
- Senior (4)

Q3 Major #1

Q6 Major #2 (If applicable, otherwise NA)

Q8 Major #3 (If applicable, otherwise NA)

Q9 Minor #1 (If applicable, otherwise NA)

Q10 Minor #2 (If applicable, otherwise NA)

Q11 Minor #3 (If applicable, otherwise NA)

Q12 Are you a member of the Honors College?

- Yes (1)
- No (2)

Q15 Select the GPA range that applies to you:

- 3.75-4.00 (1)
- 3.50-3.75 (2)
- 3.25-3.50 (3)
- 3.00-3.25 (4)
- 2.50-3.00 (5)
- 2.00-2.50 (6)
- Below 2.00 (7)

Q16 How many hours of MATH courses have you taken? (Please respond with a numeric answer i.e. "3" not "three")

Q17 Select from the list below the 2000 to 3000- level ECON courses you have taken (include those that you have received credit by testing (AP, CLEP, etc.), transfer hours, and taken at the U of A):

- ECON 2013 Principles of Macroeconomics (1)
- ECON 2023 Principles of Microeconomics (2)
- ECON 2143 Basic Economics: Theory and Practice (3)
- ECON 3033 Microeconomics Theory (4)
- ECON 3053 Economics for Elementary Teachers (5)
- ECON 3063 Economics for Secondary Educators (6)
- ECON 3133 Macroeconomic Theory (7)
- ECON 330V Economics Study Abroad **This is different than International and Business Seminar i.e. Japan Study Abroad** (8)
- ECON 3333 Public Economics (9)
- ECON 3433 Money and Banking (10)
- ECON 3533 Labor Economics (11)
- ECON 3633 Economics of Advertising (12)
- ECON 3843 Economic Development, Poverty & the Role of the World Bank and IMF in Low-Income Countries (13)

- ECON 3853 Emerging Markets (14)
- ECON 3933 The Japanese Economic System (15)
- ECON 399VH Honors Course (16)

Q39 Select from the list below the 4000 level ECON courses you have taken (include those that you have received credit by testing (AP, CLEP, etc.), transfer hours, and taken at the U of A):

- ECON 4003H Honors Economics Colloquium (1)
- ECON 4033 History of Economic Thought (2)
- ECON 410V Special Topics in Economics (3)
- ECON 4173 Nation Model United Nations (4)
- ECON 4333 Economics of Organizations (5)
- ECON 4423 Behavioral Economics (6)
- ECON 4433 Experimental Economics (7)
- ECON 450V Independent Study (8)
- ECON 4533 China's Foreign Trade and International Order: History, Policy, and Theory (9)
- ECON 4633 International Trade (10)
- ECON 4643 International Macroeconomics and Finance (11)
- ECON 468V International Economics and Business Seminar (12)
- ECON 4743 Introduction to Econometrics (13)
- ECON 4753 Forecasting (14)

Q18 Select from the list below the 1000 level MATH course that you have taken (include those that you have received credit by testing (AP, CLEP, etc.), transfer hours, and taken at the U of A)

- MATH 0003 Beginning and Intermediate Algebra (1)
- MATH 1203 College Algebra (2)
- MATH 1204 College Algebra with Review (3)
- MATH 1213 Plane Trigonometry (4)
- MATH 1284 Precalculus Mathematics (5)
- MATH 1313 Quantitative Reasoning (6)

Q40 Select from the list below the 2000 level MATH courses that you have taken (include those that you have received credit by testing (AP, CLEP, etc.), transfer hours, and taken at the U of A):

- MATH 2033 Mathematical Thought (1)
- MATH 2043 Survey of Calculus (2)
- MATH 2053 Finite Mathematics (3)
- MATH 2183 Mathematical Reasoning in a Quantitative World (4)
- MATH 2213 Survey of Mathematical Structures 1 (5)
- MATH 2223 Survey of Mathematical Structures 2 (6)
- MATH 2445 Calculus 1 with Review (7)
- MATH 2554 Calculus 1 (8)

- MATH 2564 Calculus 2 (9)
- MATH 2574 Calculus 3 (10)
- MATH 2584 Elementary Differential Equations (11)
- MATH 2603 Discrete Mathematics (12)
- MATH 2701 Survey of Higher Math (13)
- MATH 2803 Transition to Advanced Mathematics (14)
- MATH 2903 Functions, Foundations, and Models (15)

Q43 Select from the list below the 3000 level MATH courses that you have taken (include those that you have received credit by testing (AP, CLEP, etc.), transfer hours, and taken at the U of A):

- MATH 3013 Introduction to Probability (1)
- MATH 3083 Linear Algebra (2)
- MATH 3093 Abstract Linear Algebra (3)
- MATH 3103 Combinatorial and Discrete Mathematics (4)
- MATH 3113 Introduction to Abstract Algebra 1 (5)
- MATH 3133 History of Mathematics (6)
- MATH 3203 Number Theory (7)
- MATH 3513 Elementary Analysis (8)
- MATH 3773 Foundations of Geometry 1 (9)
- MATH 3923H Honors Colloquium (10)
- MATH 399VH Honors Mathematics Couse (11)

Q44 Select from the list below the 4000 level MATH courses that you have taken (include those that you have received credit by testing (AP, CLEP, etc.), transfer hours, and taken at the U of A):

- MATH 400V Directed Readings (1)
- MATH 404V Classroom Practices in Mathematics (2)
- MATH 405V Internship in Professional Practice (3)
- MATH 4103 Advanced Linear Algebra (4)
- MATH 4113 Introduction to Abstract Algebra 2 (5)
- MATH 4153 Mathematical Modeling (6)
- MATH 4163 Dynamic Models in Biology (7)
- MATH 4173 Mathematical CAM Design (8)
- MATH 4253 Symbolic Logic 1 (9)
- MATH 4353 Numerical Linear Algebra (10)
- MATH 4363 Numerical Analysis (11)
- MATH 4423 Introduction to Partial Differential Equations (12)
- MATH 4443 Complex Variables (13)
- MATH 4503 Differential Geometry (14)
- MATH 4513 Advanced Calculus 1 (15)

- MATH 4523 Advanced Calculus 2 (16)
- MATH 4933 Mathematics Major Seminar (17)
- 498V Senior Thesis (18)
- 499V Research Topics in Mathematics (19)

Q45 Select from the list below the STAT courses that you have taken (include those that you have received credit by testing (AP, CLEP, etc.), transfer hours, and taken at the U of A):

- STAT 2023. Biostatistics (1)
- STAT 2303. Principles of Statistics (2)
- STAT 3013. Introduction to Probability (3)
- STAT 4001L. Statistics Methods Laboratory (4)
- STAT 4003. Statistical Methods (5)
- STAT 4033. Nonparametric Statistical Methods (6)
- STAT 4043. Sampling Techniques (7)
- STAT 405V. Internship in Professional Practice (8)
- STAT 4101L. Introduction to R (9)
- STAT 4333. Analysis of Categorical Responses (10)
- STAT 4373. Experimental Design (11)

Q19 As a student in the economics program, do you feel that there are too many students who are not majoring in economics that are enrolled in upper division/elective economics courses?

- Yes (1)
- No (2)

Q20 Did you take any of your math courses (Finite, Calculus, Stats, etc.) at an institution other than the University of Arkansas?

- Yes (1)
- No (2)

Skip To: Q23 If Did you take any of your math courses (Finite, Calculus, Stats, etc.) at an institution other tha... = No

Q21 If you answered "Yes" to the previous question, did you take the class in-person (face-to-face) or online?

- In-person (1)
- Online (2)

Q23 If economics courses were more mathematically challenging would you consider a different major?

- Yes (1)
- No (2)

Skip To: Q25 If If economics courses were more mathematically challenging would you consider a different major? = No

Q24 If you answered “Yes” to the previous question, what major would you consider changing to?

Q25 Do you feel that you know what types of courses/topics in economics (outside of required courses for a major or minor) you would like to take?

- Yes (1)
- No (2)

Q26 Do you feel that the University of Arkansas economics department is lacking course offerings or topics? (Ex: Game Theory, Behavioral Economics, Advanced Econometrics, Managerial Economics, Industrial Organization, Economic Modeling, etc.)

- Yes (1)
- No (2)

Skip To: Q29 If Do you feel that the University of Arkansas economics department is lacking course offerings or t... = No

Q27 If you answered “Yes” to the previous question, what course topics do you think should be offered?

Q29 Do you feel that in your experience as an economics major that you are aware of courses available to you?

- Yes (1)
- No (2)

Q30 Do you feel that elective courses in the economics program are well publicized to students majoring in economics?

- Yes (1)
- No (2)

Q31 Describe how well you agree with the following statements below (Please give a rating even if you have not taken the course described) :

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I associate mathematics with difficulty. (1)	○	○	○	○	○
I feel that algebra is/would be difficult. (2)	○	○	○	○	○
I feel that statistics is/would be difficult. (3)	○	○	○	○	○
I feel that Calculus 1 is/would be difficult. (4)	○	○	○	○	○
I feel that Calculus 2 is/would be difficult. (5)	○	○	○	○	○
I feel that Calculus 3 is/would be difficult. (6)	○	○	○	○	○
I feel that Linear Algebra is/would be difficult. (7)	○	○	○	○	○
I feel that Differential Equations is/would be difficult. (8)	○	○	○	○	○

Q25 Describe how well you agree with the following statements below

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I feel that I am prepared mathematically for economics coursework at the University of Arkansas, specifically upper-division courses. (1)	○	○	○	○	○
I would rather take an easier course that I know I will do well in than a more difficult course that I might not be as successful in. (2)	○	○	○	○	○
I feel that studying economics requires a foundation of mathematics. (3)	○	○	○	○	○
I feel that economics courses at the University of Arkansas could be taught using more math. (4)	○	○	○	○	○
I feel that my economics instructors teach content with too much emphasis on mathematical ability. (5)	○	○	○	○	○
I feel that my instructors have difficulty explaining topics requiring mathematics. (6)	○	○	○	○	○

Q45 Describe how well you agree with the following statements below

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I feel that if I was required to take more math courses I would have a better understanding of content in my economics courses. (1)	○	○	○	○	○
Upon declaring a major in economics, I felt that I understood the level of math that would be required in upper-division courses. (2)	○	○	○	○	○
I feel that too much time has passed between my last math course and economics courses that require more math. (3)	○	○	○	○	○
I believe that coding and/or computational courses would be beneficial to my economics education and would add value to my skill set when going into the workforce or Graduate School. (4)	○	○	○	○	○
I feel comfortable interpreting results from a mathematical/statistical model. (5)	○	○	○	○	○
I feel comfortable coding or creating a mathematical model using statistical software/tools. Ex: SAS, R, Python, EViews, Stata, Excel, Matlab, Minitab, Mathematica, etc. (6)	○	○	○	○	○

Q26 Are you planning to enter the workforce upon graduation?

- ○ Yes (1)
- ○ No (2)

Skip To: Q31 If Are you planning to enter the workforce upon graduation? = No

Q28 If you are planning to enter the workforce upon graduation, what is your intended industry of employment? (Ex: Financial Services, Government, Consulting, Non-profit, etc.) If you are not planning to enter the workforce upon graduation, please respond N/A.

Q29 If you are planning to enter the workforce upon graduation, what is your expected salary? (Please only answer if you have accepted a position and know your starting salary, otherwise please respond N/A)

Q30 If you are planning to enter the workforce upon graduation, do you feel that your current quantitative skillset excludes you from positions that you would like to apply for?

- Yes (1)
- No (2)

Q31 Are you planning to attend graduate school upon graduation?

- Yes (1)
- No (2)

Skip To: Q35 If Are you planning to attend graduate school upon graduation? = No

Q32 If you are planning to attend graduate school upon graduation, what is your intended graduation program?

Q33 If you are planning to attend graduate school upon graduation, do you feel that your current mathematical skillset meets the requirements of the program for which you are applying/have accepted to?

- Yes (1)
- No (2)

Skip To: Q35 If If you are planning to attend graduate school upon graduation, do you feel that your current math... = Yes

Q34 If you answered "No" to the question above, what mathematical coursework are you lacking? Ex: Linear Algebra, Calculus, Differential Equations, Programming coursework, etc.

Q35 Do you have any other plans that do not include entering the workforce or attending graduate school after graduation?

- Yes (1)
- No (2)

Skip To: Q36 If Do you have any other plans that do not include entering the workforce or attending graduate scho... = No

Q36 If you answered "Yes" to the question above, what are your plans for after graduation?

Q42 If you have any additional comments, remarks, or input that was not otherwise covered in this survey please describe below. If none, please respond N/A

Q38 Would you like to provide your name to be contacted for additional information? If so, please provide your name in the box below, otherwise please respond N/A

Q39 Would you like to provide your email to be contacted for additional information? Please write email address in box below.

Survey 2.2

Default Report

Honors Thesis Student Survey

April 5th 2018, 10:26 pm MDT

Q47 - Consent.

University of Arkansas Consent to Act as a Research Subject Economics Experiment Sam M. Walton College of Business student, Will Watkins, is conducting a research study about the University of Arkansas Economics Program. The purpose of this research is to better understand the student perspective of the economics program and develop a recommendation for a more competitive program. You have been asked to participate in this study because you have declared an economics major either in WCOB or Fulbright College. Participating in this survey will

take approximately 13 minutes. You will be asked multiple choice and free response questions regarding your demographics and economics program experience. If you have questions, comments, concerns, or need clarification on a question, please contact Principle Researcher, Will Watkins (wewatkin@uark.edu) or Faculty Advisor, Bill Curington (bcurington@walton.uark.edu). If, at any point, you are uncomfortable answering the questions, you reserve the right to leave the survey. If you have questions or concerns regarding your rights as a research participant, please contact the IRB coordinator, Ro Windwalker (irb@uark.edu). Your completion of the survey indicates your consent to use your responses in this research. Participation in this survey is voluntary and refusing to participate will not adversely affect any other relationship with the University or the researchers. If you agree to participate in this study, please select "yes" below.

#	Answer	%	Count
1	Yes	98.70%	76
2	No	1.30%	1
	Total	100%	77

Q44 - Are you an Economics major in either the Walton College of Business or the Fulbright College of Arts and Sciences?

#	Answer	%	Count
1	Yes (Walton College of Business)	66.23%	51
2	Yes (Fulbright College of Arts and Sciences)	27.27%	21
3	No	6.49%	5
	Total	100%	77

Q1 - Select your classification from the list below:

#	Answer	%	Count
1	Freshman	20.83%	15
2	Sophomore	23.61%	17
3	Junior	20.83%	15
4	Senior	34.72%	25
	Total	100%	72

Q3 - Major #1

Major #1
International Economics and Business
Economics
Business Economics

Q6 - Major #2 (If applicable, otherwise NA)

Major #2 (If applicable, otherwise NA)	
Marketing	History
Accounting	Criminal justice
Management	French
Spanish	Political Science
Supply Chain	Psychology
Political Science	Economics

Economics	Anthropology
International Studies	Pre-Medical
Information Systems	Political Science
Human Resource Management	Economics
Physics	International Studies
Biology (Fulbright)	Information Systems
Finance(Minor)	Mathematics
Retail Supply Chain Management	Accounting
Finance	Supply Chain Management
Economics	Marketing
Journalism: Public Relations and Advertising	Spanish
	Political Science

Q8 - Major #3 (If applicable, otherwise NA)

Major #3 (If applicable, otherwise NA)
Political Science
Mathematics
Philosophy
International Marketing ; Also French

Q9 - Minor #1 (If applicable, otherwise NA)

Minor #1 (If applicable, otherwise NA)	
Math	Finance
Poly Sci	Business Analytics
Non Profit Studies	Finance
Marketing	Math
Supply Chain	French
Chinese	Behavioral Economics
Analytics	Statistics
Spanish	German
Financial Economics	Marketing
Legal Studies	Chinese
Statistics	Music
International Development	Supply Chain Management
Finance	Math
Business Analytics	Business Analytics
Japanese	Political Science
Business Analytics	Spanish
Spanish	Business Management
Behavioral Economics	Criminal Justice or Anthropology
Sustainability	Legal Studies
Nonprofit Studies	Religious Studies

Q10 - Minor #2 (If applicable, otherwise NA)

Minor #2 (If applicable, otherwise NA)
Political science
Marketing
Chinese
Arabic
NA
Business Analytics
Behavioral economics
Legal Studies
Spanish
Sustainablity
Accounting
Information Systems
Mathematics

Q11 - Minor #3 (If applicable, otherwise NA)

Minor #3 (If applicable, otherwise NA)
History

Q12 - Are you a member of the Honors College?

#	Answer	%	Count
1	Yes	62.86%	44
2	No	37.14%	26
	Total	100%	70

Q15 - Select the GPA range that applies to you:

#	Answer	%	Count
1	3.75-4.00	50.72%	35
2	3.50-3.75	24.64%	17
3	3.25-3.50	11.59%	8
4	3.00-3.25	10.14%	7
5	2.50-3.00	2.90%	2
6	2.00-2.50	0.00%	0
7	Below 2.00	0.00%	0
	Total	100%	69

Q16 - How many hours of MATH courses have you taken? (Please respond with a numeric answer i.e. "3" not "three")

Data source misconfigured for this visualization

Q17 - Select from the list below the 2000 to 3000- level ECON courses you have taken (include those that you have received credit by testing (AP,CLEP,etc), transfer hours, and taken at the U of A):

#	Answer	%	Count
1	ECON 2013 Principles of Macroeconomics	25.40%	63
2	ECON 2023 Principles of Microeconomics	24.19%	60
3	ECON 2143 Basic Economics: Theory and Practice	0.40%	1
4	ECON 3033 Microeconomics Theory	16.53%	41
5	ECON 3053 Economics for Elementary Teachers	0.00%	0
6	ECON 3063 Economics for Secondary Educators	0.00%	0
7	ECON 3133 Macroeconomic Theory	13.31%	33
8	ECON 330V Economics Study Abroad **This is different than International and Business Seminar i.e. Japan Study Abroad**	3.63%	9
9	ECON 3333 Public Economics	0.00%	0
10	ECON 3433 Money and Banking	2.02%	5
11	ECON 3533 Labor Economics	0.40%	1
12	ECON 3633 Economics of Advertising	1.61%	4
13	ECON 3843 Economic Development, Poverty & the Role of the World Bank and IMF in Low-Income Countries	2.82%	7
14	ECON 3853 Emerging Markets	2.02%	5
15	ECON 3933 The Japanese Economic System	6.45%	16
16	ECON 399VH Honors Course	1.21%	3
	Total	100%	248

Q39 - Select from the list below the 4000 level ECON courses you have taken (include those that you have received credit by testing (AP,CLEP,etc), transfer hours, and taken at the U of A):

#	Answer	%	Count
1	ECON 4003H Honors Economics Colloquium	9.43%	10
2	ECON 4033 History of Economic Thought	2.83%	3
3	ECON 410V Special Topics in Economics	0.00%	0
4	ECON 4173 Nation Model United Nations	10.38%	11
5	ECON 4333 Economics of Organizations	16.98%	18
6	ECON 4423 Behavioral Economics	4.72%	5
7	ECON 4433 Experimental Economics	7.55%	8
8	ECON 450V Independent Study	0.00%	0
9	ECON 4533 China’s Foreign Trade and International Order: History, Policy, and Theory	0.00%	0
10	ECON 4633 International Trade	7.55%	8
11	ECON 4643 International Macroeconomics and Finance	4.72%	5
12	ECON 468V International Economics and Business Seminar	2.83%	3
13	ECON 4743 Introduction to Econometrics	20.75%	22
14	ECON 4753 Forecasting	12.26%	13
	Total	100%	106

Q18 - Select from the list below the 1000 level MATH course that you have taken (include those that you have received credit by testing (AP,CLEP,etc), transfer hours, and taken at the U of A)

#	Answer	%	Count
1	MATH 0003 Beginning and Intermediate Algebra	12.50%	8
2	MATH 1203 College Algebra	43.75%	28
3	MATH 1204 College Algebra with Review	4.69%	3
4	MATH 1213 Plane Trigonometry	9.38%	6
5	MATH 1284 Precalculus Mathematics	28.13%	18
6	MATH 1313 Quantitative Reasoning	1.56%	1
	Total	100%	64

Q40 - Select from the list below the 2000 level MATH courses that you have taken (include those that you have received credit by testing (AP,CLEP,etc), transfer hours, and taken at the U of A):

#	Answer	%	Count
1	MATH 2033 Mathematical Thought	0.00%	0
2	MATH 2043 Survey of Calculus	18.62%	27
3	MATH 2053 Finite Mathematics	30.34%	44
4	MATH 2183 Mathematical Reasoning in a Quantitative World	0.00%	0
5	MATH 2213 Survey of Mathematical Structures 1	0.00%	0
6	MATH 2223 Survey of Mathematical Structures 2	0.00%	0
7	MATH 2445 Calculus 1 with Review	0.00%	0
8	MATH 2554 Calculus 1	25.52%	37
9	MATH 2564 Calculus 2	13.79%	20
10	MATH 2574 Calculus 3	5.52%	8
11	MATH 2584 Elementary Differential Equations	4.83%	7
12	MATH 2603 Discrete Mathematics	0.69%	1
13	MATH 2701 Survey of Higher Math	0.00%	0
14	MATH 2803 Transition to Advanced Mathematics	0.69%	1
15	MATH 2903 Functions, Foundations, and Models	0.00%	0
	Total	100%	145

Q43 - Select from the list below the 3000 level MATH courses that you have taken (include those that you have received credit by testing (AP,CLEP,etc), transfer hours, and taken at the U of A):

#	Answer	%	Count
1	MATH 3013 Introduction to Probability	22.22%	2
2	MATH 3083 Linear Algebra	44.44%	4
3	MATH 3093 Abstract Linear Algebra	22.22%	2
4	MATH 3103 Combinatorial and Discrete Mathematics	0.00%	0
5	MATH 3113 Introduction to Abstract Algebra 1	11.11%	1
6	MATH 3133 History of Mathematics	0.00%	0
7	MATH 3203 Number Theory	0.00%	0
8	MATH 3513 Elementary Analysis	0.00%	0
9	MATH 3773 Foundations of Geometry 1	0.00%	0
10	MATH 3923H Honors Colloquium	0.00%	0
11	MATH 399VH Honors Mathematics Couse	0.00%	0
	Total	100%	9

Q44 - Select from the list below the 4000 level MATH courses that you have taken (include those that you have received credit by testing (AP,CLEP,etc), transfer hours, and taken at the U of A):

#	Answer	%	Count
1	MATH 400V Directed Readings	0.00%	0
2	MATH 404V Classroom Practices in Mathematics	0.00%	0
3	MATH 405V Internship in Professional Practice	0.00%	0
4	MATH 4103 Advanced Linear Algebra	0.00%	0
5	MATH 4113 Introduction to Abstract Algebra 2	16.67%	1
6	MATH 4153 Mathematical Modeling	0.00%	0
7	MATH 4163 Dynamic Models in Biology	0.00%	0
8	MATH 4173 Mathematical CAM Design	0.00%	0
9	MATH 4253 Symbolic Logic 1	0.00%	0
10	MATH 4353 Numerical Linear Algebra	0.00%	0
11	MATH 4363 Numerical Analysis	0.00%	0
12	MATH 4423 Introduction to Partial Differential Equations	33.33%	2
13	MATH 4443 Complex Variables	16.67%	1
14	MATH 4503 Differential Geometry	0.00%	0
15	MATH 4513 Advanced Calculus 1	16.67%	1
16	MATH 4523 Advanced Calculus 2	16.67%	1
17	MATH 4933 Mathematics Major Seminar	0.00%	0
18	498V Senior Thesis	0.00%	0
19	499V Research Topics in Mathematics	0.00%	0
	Total	100%	6

Q45 - Select from the list below the STAT courses that you have taken (include those that you have received credit by testing (AP,CLEP,etc), transfer hours, and taken at the U of A):

#	Answer	%	Count
1	STAT 2023. Biostatistics	28.00%	7
2	STAT 2303. Principles of Statistics	52.00%	13
3	STAT 3013. Introduction to Probability	4.00%	1
4	STAT 4001L. Statistics Methods Laboratory	4.00%	1
5	STAT 4003. Statistical Methods	4.00%	1
6	STAT 4033. Nonparametric Statistical Methods	0.00%	0
7	STAT 4043. Sampling Techniques	0.00%	0
8	STAT 405V. Internship in Professional Practice	0.00%	0
9	STAT 4101L. Introduction to R	8.00%	2
10	STAT 4333. Analysis of Categorical Responses	0.00%	0
11	STAT 4373. Experimental Design	0.00%	0
	Total	100%	25

Q19 - As a student in the economics program, do you feel that there are too many students who are not majoring in economics that are enrolled in upper division/elective economics courses?

#	Answer	%	Count
1	Yes	33.33%	22
2	No	66.67%	44
	Total	100%	66

Q20 - Did you take any of your math courses (Finite, Calculus, Stats, etc.) at an institution other than the University of Arkansas?

#	Answer	%	Count
1	Yes	53.03%	35
2	No	46.97%	31
	Total	100%	66

Q21 - If you answered "Yes" to the previous question, did you take the class in-person (face-to-face) or online?

#	Answer	%	Count
1	In-person	71.43%	25
2	Online	28.57%	10
	Total	100%	35

Q23 - If economics courses were more mathematically challenging would you consider a different major?

#	Answer	%	Count
1	Yes	31.82%	21
2	No	68.18%	45
	Total	100%	66

Q24 - If you answered "Yes" to the previous question, what major would you consider changing to?

Management	Journalism
Supply Chain Management or Marketing	I would revert back to my second major
Management	Marketing
Agriculture	Finance
Economics	Finance
Marketing or Management	Just dropping the economics major and keeping my other
Marketing	Business
Business Marketing	Public Administration
International Business	Marketing
	History
	Supply Chain Management

Q25 - Do you feel that you know what types of courses/topics in economics (outside of required courses for a major or minor) you would like to take?

#	Answer	%	Count
1	Yes	71.21%	47
2	No	28.79%	19
	Total	100%	66

Q26 - Do you feel that the University of Arkansas economics department is lacking course offerings or topics? (Ex: Game Theory, Behavioral Economics, Advanced Econometrics, Managerial Economics, Industrial Organization, Economic Modeling, etc.)

#	Answer	%	Count
1	Yes	60.61%	40
2	No	39.39%	26
	Total	100%	66

Q27 - If you answered "Yes" to the previous question, what course topics do you think should be offered?

Behavioral economics, Game Theory
Advanced Game Theory, Adv. Econometrics, Economic Modeling
Behavioral Economics
More statistical analysis using R and analysis study.
game theory
Behavior Econ
Behavioral Economics, Advanced Econometrics, Managerial Economics, Industrial Organization, Economic Modeling, etc. I feel like I need to learn more to be able to call myself an economist.
Game Theory, Statistics, Modeling
More public sector economic courses
Game theory, an advanced economic development course
Applied Financial Economics Course
Game Theory, Economic Research, Economics of Sustainability, Historical Economics, Economic Policy
More Econometrics, Forecasting, Modeling, Game Theory
More classes on international economics; classes that incorporate more mathematics and statistics.
Governmental, monopsony
Intermediate econometrics, greater selection of applied economics classes (behavioral, more classes related to international trade, etc.)
Health care economics and game theory
Game theory, behavioral economics, industrial organizational, managerial Econ, more microeconomic courses to prepare for business application of the material learned
More International Courses
Game Theory
Foreign economic systems beyond Japanese economics.
Stock market courses
Game theory, Managerial Economics, Economic Modeling. Economic Analysis for Business. More real world applicable courses instead of theory courses
Behavioral Economics and Economic Modeling
game theory, financial economics
I think some classes more related to Economic Modeling would be positive additions.
Game Theory
I think more courses in stats or modeling would be very beneficial
Environmental Economics, Health Care economics
game theory, more advanced theory, economics of education, gender economics, modeling, mathematical methods
Game Theory, Advanced Econometrics, Any course that actually uses calculus
Special topic courses

More classes that emphasize statistical analysis of economic events
More technical courses
Game Theory, Industrial Organization

Q29 - Do you feel that in your experience as an economics major that you are aware of courses available to you?

#	Answer	%	Count
1	Yes	65.15%	43
2	No	34.85%	23
	Total	100%	66

Q30 - Do you feel that elective courses in the economics program are well publicized to students majoring in economics?

#	Answer	%	Count
1	Yes	24.24%	16
2	No	75.76%	50
	Total	100%	66

Q31 - Describe how well you agree with the following statements below (Please give a rating even if you have not taken the course described) :

#	Question	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
1	I associate mathematics with difficulty.	13.64%	9	28.79%	19	19.70%	13	25.76%	17	12.12%	8	66
2	I feel that algebra is/would be difficult.	39.39%	26	34.85%	23	10.61%	7	7.58%	5	7.58%	5	66
3	I feel that statistics is/would be difficult.	24.24%	16	39.39%	26	19.70%	13	13.64%	9	3.03%	2	66
4	I feel that Calculus 1 is/would be difficult.	12.12%	8	30.30%	20	18.18%	12	28.79%	19	10.61%	7	66
5	I feel that Calculus 2 is/would be difficult.	7.58%	5	12.12%	8	15.15%	10	31.82%	21	33.33%	22	66
6	I feel that Calculus 3 is/would be difficult.	7.58%	5	6.06%	4	13.64%	9	30.30%	20	42.42%	28	66
7	I feel that Linear Algebra is/would be difficult.	4.55%	3	15.15%	10	27.27%	18	31.82%	21	21.21%	14	66
8	I feel that Differential Equations is/would be difficult.	7.58%	5	6.06%	4	19.70%	13	34.85%	23	31.82%	21	66

Q25 - Describe how well you agree with the following statements below

#	Question	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
1	I feel that I am prepared mathematically for economics coursework at the University of Arkansas, specifically upper-division courses.	4.55%	3	18.18%	12	21.21%	14	31.82%	21	24.24%	16	66
2	I would rather take an easier course that I know I will do well in than a more difficult course that I might not be as successful in.	10.61%	7	22.73%	15	31.82%	21	27.27%	18	7.58%	5	66
3	I feel that studying economics requires a foundation of mathematics.	0.00%	0	6.06%	4	12.12%	8	48.48%	32	33.33%	22	66
4	I feel that economics courses at the University of Arkansas could be taught using more math.	4.55%	3	15.15%	10	24.24%	16	28.79%	19	27.27%	18	66
5	I feel that my economics instructors teach content with too much emphasis on mathematical ability.	16.67%	11	36.36%	24	25.76%	17	12.12%	8	9.09%	6	66
6	I feel that my instructors have difficulty explaining topics requiring mathematics.	7.58%	5	27.27%	18	28.79%	19	24.24%	16	12.12%	8	66

Q45 - Describe how well you agree with the following statements below

#	Question	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
1	I feel that if I was required to take more math courses I would have a better understanding of content in my economics courses.	1.72%	1	20.69%	12	17.24%	10	37.93%	22	22.41%	13	58
2	Upon declaring a major in economics, I felt that I understood the level of math that would be required in upper-division courses.	8.62%	5	34.48%	20	18.97%	11	32.76%	19	5.17%	3	58
3	I feel that too much time has passed between my last math course and economics courses that require more math.	3.45%	2	24.14%	14	20.69%	12	34.48%	20	17.24%	10	58
4	I believe that coding and/or computational courses would be beneficial to my economics education and would add value to my skill set when going into the workforce or Graduate School.	1.72%	1	13.79%	8	22.41%	13	20.69%	12	41.38%	24	58
5	I feel comfortable interpreting results from a mathematical/statistical model.	3.45%	2	6.90%	4	27.59%	16	48.28%	28	13.79%	8	58

6	I feel comfortable coding or creating a mathematical model using statistical software/tools. Ex: SAS, R, Python, EViews, Stata, Excel, Matlab, Minitab, Mathematica, etc.	29.31%	17	37.93%	22	15.52%	9	15.52%	9	1.72%	1	58

Q26 - Are you planning to enter the workforce upon graduation?

#	Answer	%	Count
1	Yes	67.24%	39
2	No	32.76%	19
	Total	100%	58

Q28 - If you are planning to enter the workforce upon graduation, what is your intended industry of employment? (Ex: Financial Services, Government, Consulting, Non-profit, etc.) If you are not planning to enter the workforce upon graduation, please respond N/A.

Retail	Non-profit
Consulting	Management
Education	Private industry
Government	Non-profit
Consulting	Financial Consulting
Financial services	Consulting
Consulting	Government
Human Resources, Data	Supply chain analysis/strategy
Financial Services or Government	Government
Consulting	Internet
Financial Services	Consulting
Government	Self employed
Transportation	Financial services
Government	Defense Industry
Financial service	Government/Financial Services
Actuarial Sciences	Financial Services
Economic Modeling	Investment Banking
Investments/Finance	

Q29 - If you are planning to enter the workforce upon graduation, what is your expected salary? (Please only answer if you have accepted a position and know your starting salary, otherwise please respond N/A)

60,000	75,000
67,000	50,000
77,500	70,000
35,000 (Summer internship annual rate)	70,000
68,000	$50,000
51,000	$75,000
70,000	55,000
	58,000

Q30 - If you are planning to enter the workforce upon graduation, do you feel that your current quantitative skillset excludes you from positions that you would like to apply for?

#	Answer	%	Count
1	Yes	60.53%	23
2	No	39.47%	15
	Total	100%	38

Q31 - Are you planning to attend graduate school upon graduation?

#	Answer	%	Count
1	Yes	49.12%	28
2	No	50.88%	29
	Total	100%	57

Q32 - If you are planning to attend graduate school upon graduation, what is your intended graduation program?

If you are planning to attend graduate school upon graduation, what is your intended graduation program?	Law
Ph.D in Econ; Potential C.P.A.	Not for sure
Unknown program	MBA
Unsure	Law
I am unsure	Development Studies/Economics
Medical school	NA
MBA	Economics
Clinton School for Public Service	PhD
economics graduate program (applying this December for the following school year after taking more math classes lol)	Duke
Health care economics	Actuarial Science & Education
Law School	No idea
Law School	JD
Law School	Law School
Law School	Law School
University of Oklahoma Medical Program	

Q33 - If you are planning to attend graduate school upon graduation, do you feel that your current mathematical skillset meets the requirements of the program for which you are applying/have accepted to?

#	Answer	%	Count
1	Yes	60.71%	17
2	No	39.29%	11
	Total	100%	28

Q34 - If you answered "No" to the question above, what mathematical coursework are you lacking? Ex: Linear Algebra, Calculus, Differential Equations, Programming coursework, etc.

If you answered "No" to the question above, what mathematical coursework are you lacking? Ex: Linear Algebra, Calculus, Differential Equations, Programming coursework, etc.
Diff/Eq, Adv. Calc., Statistics and Modeling; Econometrics
Algebra, programming
Linear algebra, differential equations, real analysis
Differential equations, programming, linear algebra
I do not know
It has been a while since I have actually done significant Calculus, so a mixture of that as well as differential equations I feel like I am lacking.
NA
Programming, real analysis, more upper level
Differential Equations, Calculus 3
Linear Algebra, Differential Equations, Programming coursework
Linear Algebra and Differential Equations

Q35 - Do you have any other plans that do not include entering the workforce or attending graduate school after graduation?

#	Answer	%	Count
1	Yes	12.28%	7
2	No	87.72%	50
	Total	100%	57

Q36 - If you answered "Yes" to the question above, what are your plans for after graduation?

If you answered "Yes" to the question above, what are your plans for after graduation?
Volunteer work
Studying classical Arabic for religious reasons
gap year to be a consultant for my sorority
waiting to hear back on a Fulbright grant (teaching English abroad for 1 year)
Peace corps
Potential research opportunities before entering grad school
Return home to teach

Q42 - If you have any additional comments, remarks, or input that was not otherwise covered in this survey please describe below. If none, please respond N/A

If you have any additional comments, remarks, or input that was not otherwise covered in this survey please describe below. If none, please respond N/A
I would have liked to take more math courses to have a better chance to enter grad school.
The economics department (in the business school) does not adequately teach skills for any applied economics positions.
As an Econ major through Fulbright, I wish I had information about Economics special topics courses
I'm a History and Economics major so I have options upon graduation. If I plan on pursuing my History major more, then graduate school is more likely. With Economics, graduate school could happen, but I'd more prefer to enter the workforce upon graduation if I pursued that major more.
This is very relevant thesis work. Honestly am excited to hear the results
There should be an honors-society type of organization for Econ majors, if there is, it is not publicized enough
I took calculus over a year before declaring ECON major and it has been hard to remember some parts of it while taking these classes
The university of Arkansas econ departments only prepares students for research roles, not real-world roles.
I feel like the economics program has poorly prepared me for economic positions. I wanted to apply for a position at the Fed to be a Research Assistance in the economics department, but I didn't have enough experience in math or the statistical applications they use (Stata and R) to realistically apply
I don't know if am going to grad school or not, but if I did I would go for IS not ECON
Professors with more diverse research interests would support a more rigorous and diverse program
More math

Survey 2.3

UNIVERSITY OF ARKANSAS

To:	Will E. Watkins BELL 4188
From:	Douglas James Adams, Chair IRB Committee
Date:	03/20/2018
Action:	**Exemption Granted**
Action Date:	03/20/2018
Protocol #:	1802104206
Study Title:	University of Arkansas Economics Major Survey

The above-referenced protocol has been determined to be exempt.

If you wish to make any modifications in the approved protocol that may affect the level of risk to your participants, you must seek approval prior to implementing those changes. All modifications must provide sufficient detail to assess the impact of the change.

If you have any questions or need any assistance from the IRB, please contact the IRB Coordinator at 109 MLKG Building, 5-2208, or irb@uark.edu.

cc: Bill Curington, Investigator

Page 1 of 1

Tables

Table 1

Major	Frequency
Marketing	33%
Finance	11%
Journalism	11%
Management	11%
Supply Chain Management	11%
Anthropology	6%
Business	6%
History	6%
International Business	6%
Political Science	6%
Public Administration	6%

Table 2

Courses	Frequency	Courses	Frequency
Game Theory	39%	Economics of Sustainability	3%
Economic Modeling	24%	Environmental Economics	3%
Behavioral Economics	15%	Forecasting	3%
Advanced Econometrics	12%	Gender Economics	3%
Industrial Organization	9%	Historical Economics	3%
International Economic Systems Courses	9%	International Trade	3%
Managerial Economics	9%	Mathematical Methods	3%
Financial Economics	6%	Monopsony	3%
Health Care Economics	6%	More Calculus Based Coursework	3%
Public Economics	6%	More Math Based Coursework	3%
Advanced Theory	3%	Programming	3%
Applied Econometrics	3%	Special Topics	3%
Applied Microeconomics	3%	Technical Courses	3%
Business Practicum	3%	Economic Policy	3%
Development Economics	3%	Economic Research	3%
Economic Analysis	3%	Economics of Education	3%

Table 3

Quantitative Questions	Score:
I associate mathematics with difficulty.	2.92
I feel that algebra is/would be difficult.	2.1
I feel that statistics is/would be difficult.	2.26
I feel that Calculus 1 is/would be difficult.	2.93
I feel that Calculus 2 is/would be difficult.	3.7
I feel that Calculus 3 is/would be difficult.	3.9
I feel that Linear Algebra is/would be difficult.	3.52
I feel that Differential Equations is/would be difficult.	3.77

Table 4

Economics Questions (Block 1)	Score
I feel that I am prepared mathematically for economics coursework at the University of Arkansas, specifically upper-division courses.	3.54

I would rather take an easier course that I know I will do well in than a more difficult course that I might not be as successful in.	2.98
I feel that studying economics requires a foundation of mathematics.	4.11
I feel that economics courses at the University of Arkansas could be taught using more math.	3.62
I feel that my economics instructors teach content with too much emphasis on mathematical ability.	2.59
I feel that my instructors have difficulty explaining topics requiring mathematics.	3.08

Table 5

Economics Questions (Block 2)	**Score**
I feel that if I was required to take more math courses I would have a better understanding of content in my economics courses.	3.57
Upon declaring a major in economics, I felt that I understood the level of math that would be required in upper-division courses.	2.89
I feel that too much time has passed between my last math course and economics courses that require more math.	3.36
I believe that coding and/or computational courses would be beneficial to my economics education and would add value to my skill set when going into the workforce or Graduate School.	3.89
I feel comfortable interpreting results from a mathematical/statistical model.	3.66
I feel comfortable coding or creating a mathematical model using statistical software/tools. Ex: SAS, R, Python, EViews, Stata, Excel, Matlab, Minitab, Mathematica, etc.	2.25

Table 6

Key	**Score**
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

Table 7

Industry of Employment	**Count**
Financial services	8
Consulting	7
Government	6
Non-profit	2
Actuarial Sciences	1
Defense	1
Economic Modeling	1
Human Resources	1
Internet	1
Management	1
Private industry	1
Retail	1
Self employed	1
Supply Chain	1
Transportation	1

Table 8

Graduate Program	Frequency
Law School	47%
Economics	16%
MBA	11%
Medical School	11%
Actuarial Science	5%
Health care economics	5%
Public Administration	5%

Table 9

Mathematical coursework Lacking:	Frequency
Differential Equations	32%
Linear Algebra	26%
Programming	21%
Calculus	11%
Real Analysis	11%

Table 10

Additional Comments
More math
Professors with more diverse research interests would support a more rigorous and diverse program
I don't know if am going to grad school or not, but if I did I would NOT go for ECON
I feel like the economics program has poorly prepared me for economic positions. I wanted to apply for a position at the Fed to be a Research Assistant in the economics department, but I didn't have enough experience in math or the statistical applications they use (Stata and R) to realistically apply
The university of Arkansas econ departments only prepares students for research roles, not real-world roles.
I took calculus over a year before declaring ECON major and it has been hard to remember some parts of it while taking these classes
There should be an honors-society type of organization for Econ majors, if there is, it is not publicized enough
I'm a History and Economics major so I have options upon graduation. If I plan on pursuing my History major more, then graduate school is more likely. With Economics, graduate school could happen, but I'd prefer to enter the workforce upon graduation if I pursued that major more.
As an Econ major through Fulbright, I wish I had information about Economics special topics courses
The economics department (in the business school) does not adequately teach skills for any applied economics positions.
I would have liked to take more math courses to have a better chance to enter grad school.

Table 11

ACAD_PLAN=BECOBS

UA_PRIMARY_LEVEL	
UA_PRIMARY_LEVEL	Frequency
10	256
20	118
30	83
40	57

ACAD_PLAN=ECNCBA

UA_PRIMARY_LEVEL	
UA_PRIMARY_LEVEL	Frequency
10	12
20	13
30	22
40	32

Charts

Chart 1

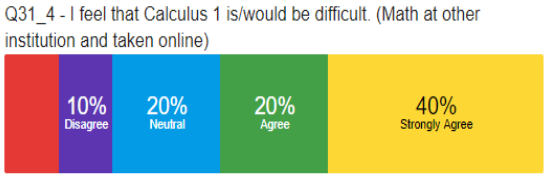


Chart 2

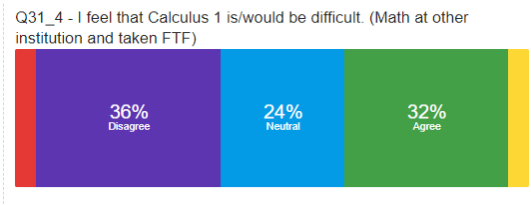


Chart 3

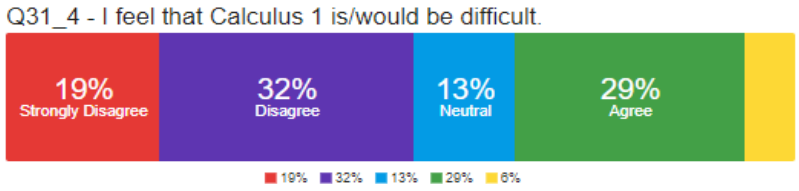
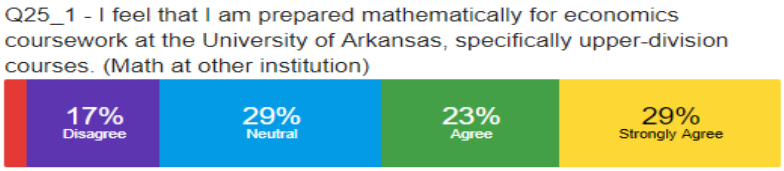


Chart 4



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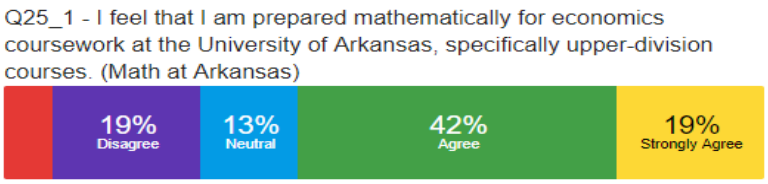


Chart 6

Chart 7

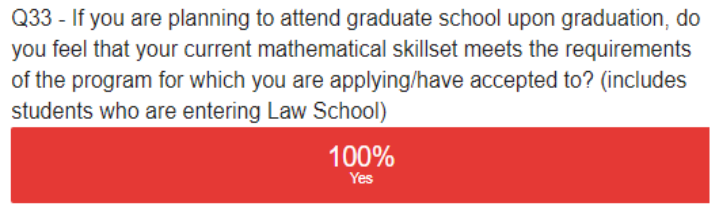
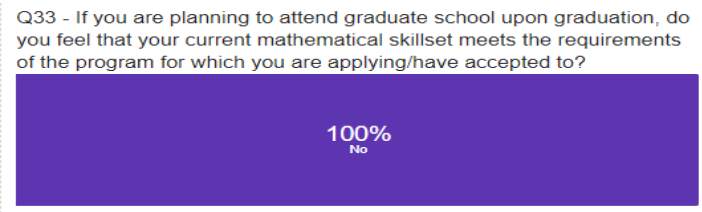


Chart 8



Peer and Aspirant Degree Plans

PA 1

Walton College Benchmarking Schools

Peer Schools

University of Kentucky, Gatton College of Business & Economics

Louisiana State University, E.J. Ourso College of Business

University of Missouri-Columbia, MU College of Business

University of South Carolina, Moore School of Business

University of Oklahoma Price College of Business

University of Tennessee at Knoxville College of Business Administration

Aspirant Schools

University of Florida Warrington College of Business Administration

University of Georgia Terry College of Business

Indiana University (Bloomington) The Kelley School of Business

University of Maryland Robert H. Smith School of Business

The Ohio State University Fisher College of Business

University of Texas at Austin McCombs School of Business

PA 2

Required Courses	*Arkansas*	*Kentucky*	*LSU*	*Mizzou*	*OU*	*S. Carolina*	*UT Knoxville*
Principles of Macro	1	1	1	1	1	1	1
Principles of Micro	1	1	1	1	1	1	1
Intermediate Micro	1	1	1	1	1	1	1
Intermediate Macro	1	1	1	1	1	1	1
Econometrics	1	0	0	1	0	1	1
Forecasting	1	0	0	1	0	0	0
History of Economic Thought	1	0	0	0	0	0	0
Survey of Calculus/ Business Calc	1	1	1	1	1	1	1

1							
Calculus 1	1	1	1	0	1	1	1
Finite Mathematics	1	1	0	0	0	0	0
Business Stat	1	1	0	0	0	0	0
Intro Stats/Prob stat 1	1	1	1	1	1	1	1
Econ electives (hours)	12	15	12	15	12	15	21
Capstone/Seminar in Economics	0	1	0	0	1	0	0
Money, Banking and Macro activity (LSU only)	0	0	1	0	0	0	0
College Algebra	0	0	1	0	0	0	0
Prob stat 2 (Mizzou Only)	0	0	0	1	0	0	0
Departmental Writing Requirement/ Thesis	1	0	0	0	0	0	0
Business Calc 2	0	0	0	0	1	0	0
Calculus 2	0	0	0	0	1	0	0

PA 3

Required Courses	***Mizzou (BS only track)***	***S. Carolina***
Principles of Micro	1	1
Principles of Macro	1	1
Intermediate Micro	1	1
Intermediate Macro	1	1
Quantitative Economics (Mizzou only)	1	0
Econometrics 1	1	1
Econometrics 2	0	0
Senior Seminar	1	0
Economics Electives hours**	9	15
Writing Requirement (component of econ electives)	1	0
Matrix Theory (aka Linear Algebra)	1	0
Calculus 1	1	1

Calculus 2	1	1
Calculus 3	1	0
Mathematical statistics (Mizzou only)	1	0
Applied Statistical Methods 1 (Mizzou only)	1	0
Probability Theory 1/ Intro to Statistics	1	1
Statistical Inference (Mizzou only)	1	0
Introduction to Advanced Mathematics (Mizzou)	1	0
Differential Equations (Mizzou)	1	0
Statistical Software and Data Analysis (Mizzou)	1	0
Applied categorical Data Analysis (Mizzou)	1	0
Applied Nonparametric Methods (Mizzou)	1	0
Sampling Techniques (Mizzou)	1	0
Biostatistics and Clinical Trials (Mizzou)	1	0
Applied Longitudinal Data Analysis (Mizzou)	1	0
Applied Statistical Models 1 (Mizzou)	1	0
Applied Multivariate Data Analysis (Mizzou)	1	0
Applied Spatial Statistics (Mizzou)	1	0
Introduction to Bayesian Data Analysis (Mizzou)	1	0
Non-parametric methods (Mizzou)	1	0
Categorical Data Analysis (Mizzou)	1	0
Time Series Analysis (Mizzou)	1	0
General Applications Programming (S. Carolina)	0	1

PA 4

Required Courses	***Arkansas***	***Kentucky***	***LSU***	***Mizzou***	***OU***	***S. Carolina***
Principles of Micro	1	1	1	1	1	1
Principles of Macro	1	1	1	1	1	1
Intermediate Micro	1	1	1	1	1	1
Intermediate Macro	1	1	1	1	1	1
Economics of	1	0	0	0	0	0

Organizations						
Econometrics 1	1	0	0	0	0	1
Forecasting	1	0	0	0	0	0
Econ Electives	9	12	12	12	12	6
Econ Capstone (Kentucky)	0	1	0	0	0	0
Money and Banking Course (LSU, Mizzou)	0	0	1	1	0	0
Finite Mathematics	1	1	0	1	0	0
Calculus 1/ Business Calc.	1	1	1	1	1	1
Cal 2/ Business Cal 2	0	0	0	0	1	0
Public Speaking	1	1	1	0	1	1
Business Law	1	1	1	1	1	1
Accounting 1	1	1	1	1	1	1
Accounting 2	1	1	1	1	1	1
Elementary Statistics/ Probability Stat 1	0	1	1	1	1	1
Probability Stat 2	0	0	0	1	0	0
Business Foundations	1	0	0	0	0	0
Intro to Management Info. Sys.	1	1	1	1	1	1
Computer Competency	1	0	0	1	1	0
Intro Management	1	1	1	1	1	1
Intermediate Management (Mizzou)	0	0	0	1	0	0
Advanced Management (Mizzou)	0	0	0	1	0	0
Intro Finance	1	1	1	0	1	1
Intro Marketing	1	1	1	1	1	1
Intro Supply Chain/Intro Operations Management	1	0	1	0	0	1
Business Capstone/Strategic Management	1	1	1	1	1	1
Business Electives (hours)	12	3	12	12	3	12

Business Statistics	1	1	1	0	0	1
Business Writing Requirement (Mizzou/ OU)	0	0	0	1	1	0
Internship Requirement (Mizzou)	0	0	0	1	0	0
Business Ethics (Ohio State/OU)	0	0	0	0	1	0

PA 5

Required Courses	***Arkansas***	***Kentucky***	***LSU***
Degree Type	***BSIB***	***BS Eco/BA FLA***	***BS Intl Trade***
Principles of Micro	1	1	1
Principles of Macro	1	1	1
Intermediate Micro	1	1	1
Intermediate Macro	1	1	1
Economics of Organizations	1	0	0
Econometrics 1	1	0	0
Econ Electives (Hours)	3	9	6
International Trade	1	0	1
International Macro & Finance	1	0	1
Money, Banking, and Macroeconomic Activity (LSU)	0	0	1
International Politics	0	0	1
Finite Mathematics	1	0	0
College Algebra	0	1	1
Calculus 1/ Business Calc.	1	1	1
Public Speaking	1	0	1
Business Law	1	0	1
Accounting 1	1	0	1
Accounting 2	1	0	1
Business Foundations	1	0	0
Intro to Management Info. Sys.	1	0	1
Computer Competency	1	0	0

Intro Management	1	0	1
Intro Finance	1	0	1
Intro Marketing	1	0	1
Intro Supply Chain/Intro Operations Management	1	0	1
Business Capstone/Strategic Management	1	0	1
Business Electives (hours)	6	0	3
Business Statistics	1	1	1
International Business Electives	9	0	6
Proficiency in Foreign Language (Hours)	15	45	0

PA 6

Behavioral Minor:
Requirements:
1) Principles of Micro
2) Principles of Macro
3) Behavioral Economics
4) Experimental Economics
5) Intermediate Micro OR Intro to Econometrics

PA 7

Financial Economics Minor:
Requirements:
1) Financial Analysis
2) Forecasting
3) Select three of the following:
Investments
Corporate Finance
Money and Banking
Introduction to Econometrics

PA 8

Applied Track	
Required Courses	*Notes*
Principles of Micro	
Principles of Macro	
Intermediate Micro	
Intermediate Macro	

Intro to Econometrics **OR** Intro to Probability and Statistics 1	
Quantitative Economics	
Econometrics **OR** Prob Stat 2 **OR** Econ Elective	
Econ Electives (12 Hours)	6 Hours at 4000 level, 3 hours of writing requirement
Complementary Electives (12 Hours)	Any Computer Science, Information systems, or 2000+ in accounting, finance, math, stat, or other STEM courses
Calculus 1 **OR** Finite Mathematics & Survey of Calculus	

PA 9

Quantitative Track	
Required Courses	*Notes*
Principles of Micro	
Principles of Macro	
Intermediate Micro	
Intermediate Macro	
Quantitative Economics	
Intro to Econometrics	
Matrix Theory (aka Linear Algebra)	
Stat 4710 and stat 4510	Introduction to Mathematical Statistics **AND** Applied Statistical Models 1
stat4750 and 4760	Introduction to Probability Theory **AND** Statistical Inference
Math/Stat Elective (3 hours)	Diff Eq, Intro to advanced mathematics, any stat 4000+
Complementary Elective (3 hours)	Any Computer science, Information systems, or 2000+ in accounting, finance, math, stat, or other STEM courses
Econ electives (12 hours)	6 Hours at 4000 level, 3 hours of writing requirement
Calculus 1	
Calculus 2	
Calculus 3	

PA 10

BA Mathematical Economics				
Econ Requirements:		***Notes:***		
	Principles of Micro			
	Principles of Macro			
	Intermediate Micro			

	Intermediate Macro			
	Economic and Business Statistics			
	Economics Electives (9 Hours)			
Math Requirements:	*Statistical Methods*			
	Calculus 1			
	Calculus 2			
	Calculus 3			
	Calculus 4			
	Intro to Probability			
	Linear Algebra			
	Math Sequence (Three Options)	*1) Introduction to Optimization, Decision making under uncertainty*	*2) Advanced Calculus 1, Advanced Calculus 2*	*3) Probability, Introductory Statistical Inference*

PA 11

LSU Empirical Economic Analysis Concentration	
Concentration Requirements:	***LSU Course Description:***
1) Introduction to Econometrics	Techniques of econometrics; estimating the basic linear model and hypothesis testing; empirical illustrations by reference to contemporary economic questions.
2) Econometric Methods	Applications of econometric methods; treatment of heteroskedasticity, autocorrelation, and generalized least squares; the use of instrumental variables and two-stage least squares for models with endogeneity, simultaneous equations, regression using time-series data, the analysis of panel data, binary and multinomial choice models, and models for simple selection.
3) Time Series Data Analysis	Applications of methods used in business and economic forecasting; economic and financial time-series modeling, regression analysis and combination forecasting.

PA 12

OU BA+MA Program
Undergraduate Requirements:
Junior or Senior year of economics degree in College of Arts and Sciences to qualify
Intermediate Micro
Intermediate Macro
Calculus 1
Calculus 2
Basic Statistics
Graduate Curriculum:
Statistics for Decision Making
Managerial Economics 1
Managerial Economics 2
Econometric Analysis OR Graduate Econ Elective (One 4000/5000 course)
Graduate Econ Electives (Two 4000/5000 courses)
Big Data Electives (Four courses from approved list)
Research in Economic Problems

PA 13

Business Analytics Concentration
Required Course:
Data Analytics for Business
Choose nine hours from the courses below:
Accounting Information Systems 1
Intro to Econometrics
Corporate Risk Management
Investment Analysis and Portfolio Management
Student Managed Investments
HR Analytics
Business Information Systems
Service Operations Management
Principles of Marketing Research

PA 14

Required Courses	***Indiana***	***Ohio State***	***Univ. Florida***	***UGA***	***Univ. Maryland***	***UT Austin***
Principles of Macro	1	1	1	1	1	1
Principles of Micro	1	1	1	1	1	1
Intermediate Micro	1	1	1	1	1	1
Intermediate Macro	1	1	1	1	1	1
Econometrics	1	1	0	0	1	1
Forecasting	0	0	0	0	1	0
Game Theory	0	0	0	0	1	0
Mathematical Economics	0	0	0	0	1	0
Economics of Cost-Benefit Analysis	0	0	0	0	1	0
History of Economic Thought	0	1	0	0	0	0
Survey of Calculus/ Business Calc. 1	1	0	1	1	1	0
Calculus 1	1	0	1	1	1	1
Finite Mathematics	1	0	0	0	0	0
Business Stat	1	0	0	0	1	0
Intro Stats/Probability stat 1	0	1	1	1	1	1
Econ electives (hours)	3	15	12	12	18	9

Concentration hours (Indiana-defined on degree sheet)	9	0	0	0	0	0
College Algebra	0	1	0	0	0	0
Departmental Writing Requirement/ Thesis	0	1	0	1	0	0
Calculus 2	0	0	0	0	0	1
Calculus 3	0	0	0	0	0	1

PA 15

Required Courses	***Ohio State***	***Univ. Maryland***
Principles of Micro	1	1
Principles of Macro	1	1
Intermediate Miro	1	1
Intermediate Macro	1	1
Econometrics 1	1	1
Forecasting	1	1
Economics Electives hours**	15	9
Writing Requirement	1	0
Calculus 1	1	1
Calculus 2	1	1
Probability Theory 1/ Intro to Statistics	1	1
Advanced Microeconomics	0	1
Advanced Macroeconomics	0	1

PA 16

Required Courses	***Ohio State***	***UGA***
Principles of Micro	1	1
Principles of Macro	1	1
Intermediate Micro	1	1
Intermediate Macro	1	1
Econometrics 1	0	0
Forecasting	0	0
Econ Electives	12	12
Pre-Calculus	0	1
Calculus 1/ Business Calc	1	1
Public Speaking	0	1
Business Law	1	1
Accounting 1	1	1
Accounting 2	1	1
Elementary Statistics/ Prob Stat 1	1	0
Intro to Management Info. Sys.	1	1
Computer Competency	1	0
Intro Management	1	1
Intro Finance	1	1
Intro Marketing	1	1
Intro Supply Chain/Intro Operations Management	1	0
Business Capstone/Strategic Management	1	0
Business Electives (hours)	8	12
Business Statistics	1	1
Business Writing Requirement (Mizzou/	0	1

OU/UGA)		
Business Ethics (Ohio State/OU)	1	0
Computer Modeling and Problem Solving (Ohio State)	1	0
Predictive Modeling and Optimization (UGA)	0	1

PA 17

Required Courses	***UGA***
Degree Type	BBA Econ/IB
Principles of Micro	1
Principles of Macro	1
Intermediate Micro	1
Intermediate Macro	1
Econometrics 1	0
Econ Electives (Hours)	9
International Trade	1
Thesis/Writing Requirement	1
Calculus 1/ business calc	1
Public Speaking	1
Business Law	1
Accounting 1	1
Accounting 2	1
Intro to Management Info. Sys.	1
Intro Management	1
Intro Finance	1
Intro Marketing	1
Intro Supply Chain/Intro Operations Management	0
Business Capstone/Strategic Management	1
Business Electives (hours)	9
Business Statistics	1
International Business Electives	3
Proficiency in Foreign Language (Hours)	21
Study Abroad Requirement or addtl FLA classes (UGA)	1

PA 18

Concentrations
Financial and Monetary Economics
In addition to the requirements listed on the BA Degree Plan students must select three courses from the following:
1) International Monetary Economics
2) Economic Development
3) Undergraduate Seminar- Computational Methods in Macroeconomics
4) Financial Economics
International and Development Economics
In addition to the requirements listed on the BA Degree Plan students must select three courses from the following:
1) International trade
2) International Monetary Economics
3) Economic Development
4) Soviet-Type Economies in Transition
5) Undergraduate Seminar- Economic Growth
6) Undergraduate Seminar- International Trade
Economics of the Public Sector and Labor Markets

In addition to the requirements listed on the BA Degree Plan students must select three courses from the following:
1) Economics of Labor Markets
2) Law and Economics
3) Public Finance: Government Spending
4) Public Finance: Taxation
Strategic Interaction
In addition to the requirements listed on the BA Degree Plan students must select three courses from the following:
1) Game Theory
2) Law and Economics
3) Economics of Industry
4) Seminar in Experimental Economics
Advanced Computation/Econometric Tools:
In addition to the requirements listed on the BA Degree Plan students must complete the following courses:
1) Undergraduate Seminar in Computational Methods and Econometrics
2)Econometric Theory and Practice 1
3) Econometric Theory and Practice 2

PA 19

Indiana Math and Economics Interdepartmental Major
Economics Requirements:
Principles of Micro
Principles of Macro
Intermediate Micro
Intermediate Macro
Econ Electives (9 hours- concentrations from concentration section will fill this requirement)
Math Requirements:
Calculus 1
Calculus 2
Calculus 3
Linear Algebra
Intro to probability and statistics OR Statistical Analysis Business/Econ
Math Electives (2 courses from one of the tracks listed below)
Math Tracks:
Analysis:
Calculus 4
Introductions to Analysis 2
Elementary Complex Variables with AP
Metric Space Topology
Diff Eq:
Intro to DE 1
Intro to DE 2
PDE w/ Application 1
PDE w/ application 2
Applied Math:
Elementary computational methods 1
Mathematical Models/applications 1
Mathematics of Finance
Numerical Analysis 1
Numerical Analysis 2
Prob/Stat:
Intro Probability Theory 1
Intro Probability Theory 2

	Intro to Mathematical Stats

PA 20

Public Policy Concentration	UGA Courses
Required Courses:	
	Public Sector Economics
	Economic Analysis of Law
	Introduction to Econometrics
Elective Courses (select one):	
	Monetary Economics
	Environmental Economics
	Economics of Education
	Health Economics
	International Trade
	Labor Economics

PA 21

Consulting Concentration:	UGA Courses
Required Courses:	
	Economics of Organizations and Management
	Introduction to Econometrics
	Competitive Strategy
Elective Courses (select one):	
	Monetary Economics
	Environmental Economics
	Urban Economics
	Economic Growth and Development
	Economics of Education
	Public Sector Economics
	Health Economics
	Industrial Economics
	Game Theory
	Economic analysis of Law
	Sports Economics
	Monetary Policy
	International Trade
	Labor Economics
	Economic History of the US
	Topics in Economic History
	Time Series Analysis

Prescribed List

PL 1

Public Policy	UA Equivalents	Notes/ Course Descriptions
Choose three courses listed below:		
Public Sector Economics	Public Economics	
Economic Analysis of Law	N/a	An efficiency-based perspective on major areas of the law, including contract, tort, and nuisance law, which points to the reduction of transactions costs as unifying legal principle. (UGA)
Introduction to Econometrics	Intro to Econometrics	
Monetary Economics	Money and Banking	
Environmental Economics	N/a	The economic foundations of global environmental problems, including air and water pollution and the depletion of natural resources, with discussions of

		alternative (command and market-based) solutions. (UGA)
Economics of Education	N/a	Application of economic principles to the production and delivery of education. Analysis of education policy and reform at the primary, secondary and post-secondary levels; e.g., policies related to teacher pay, class-size, high-stakes testing, charter schools, vouchers, affirmative action, and financial aid. International higher education policies are also discussed. (UGA)
Health Economics	N/a	Economics of health, health care, and health policy. Application of microeconomic principles to the study of individual health production and the market for health insurance, the analysis of the health-care industry, and the evaluation of health policy. (UGA)
International Trade	International Trade	
Labor Economics	Labor Economics	

PL 2

Consulting	**UA Equivalents**	**Notes/ Course Descriptions**
Choose three courses listed below:		
Economics of Organizations and Management	**Economics of Organizations with more focus on management activity.	Decision making within firms and public organizations, using standard microeconomic tools. Transaction costs and the size of the firm, the compensation and motivation of workers, mergers and corporate control, team production, and the theory of bureaucracy. (UGA)
Introduction to Econometrics	Intro to Econometrics	
Competitive Strategy	**Economics of Organizations with more focus on case studies	This course applies tools from microeconomics to decision making in environments of strategic interdependence. Topics include entry, commitment, price wars, tacit collusion, antitrust, and new product introduction. We rely heavily on case studies. (UGA)
Monetary Economics	Money and Banking	
Environmental Economics	N/a	The economic foundations of global environmental problems, including air and water pollution and the depletion of natural resources, with discussions of alternative (command and market-based) solutions. (UGA)
Urban Economics	N/a	Economic aspects of urbanization with an emphasis on inter- and intra-metropolitan location decisions of households and firms. Analysis of land, housing, and transportation markets and of local public finance and public policy in metropolitan areas. (UGA)
Economics Growth and Development	N/a	Problems and programs of economic growth; specific attention directed to underdeveloped areas, national economies, and regions. International agencies and coordinated efforts in economic development processes will be appraised within a theoretical reference. (UGA)
Economics of Education	N/a	Application of economic principles to the production and delivery of education. Analysis of education policy and reform at the primary, secondary and post-secondary levels; e.g., policies related to teacher pay, class-size, high-stakes testing, charter schools, vouchers, affirmative action, and financial aid. International higher education policies are also discussed. (UGA)
Public Sector Economics	Public Economics	
Health Economics	N/a	Economics of health, health care, and health policy. Application of microeconomic principles to the study of individual health production and the market for health insurance, the analysis of the health-care industry, and the evaluation of health policy. (UGA)
Industrial Economics	N/a	Firms' performances and conduct toward rival firms, suppliers, and customers under different market structures, including perfect competition and monopoly. The rationale and consequences of antitrust regulation and other public policies. (UGA)
Game Theory	N/a	The theory of games, with examples from economics and social sciences. A focus on non-cooperative games and the classical, rationalistic approach to strategic behavior. Formal models of strategic reasoning are presented, along with classroom experiments and examples. (UGA)

Economic analysis of Law	N/a	An efficiency-based perspective on major areas of the law, including contract, tort, and nuisance law, which points to the reduction of transactions costs as unifying legal principle. (UGA)
Sports Economics	N/a	Economic analysis of sports teams, leagues, and institutions. Topics include antitrust issues, the alleged cartel of sports leagues, public funding of sports venues, labor relations, player drafts, athlete compensation, wagering markets, and the general application of economic principles to sport settings and events. (UGA)
International Trade	International Trade	
Labor Economics	Labor Economics	
Economic History of the US	N/a	In-depth treatment of particular episodes in economic history, such as the Industrial Revolution and the Great Depression. (UGA)
Topics in Economic History	History of Economic Thought	
Time Series Analysis	Forecasting	

PL 3

Financial and Monetary Economics	**UA Equivalents**	**Notes/ Course Descriptions**
Choose three courses listed below:		
International Monetary Economics	International Macro and Finance	
Economic Development	Econ Development, Poverty, WB and IMF	
Undergraduate Seminar-Computational Methods in Macroeconomics	N/a	Additional prerequisites may be required depending on the seminar topic. Intensive study of a topic area in computational methods or econometrics. Topics will vary. (Indiana)
Financial Economics	Money and Banking	
N/a	Financial Analysis	Courses offered as Financial Economics Minor (Arkansas)
N/a	Forecasting	Courses offered as Financial Economics Minor (Arkansas)
N/a	Investments	Courses offered as Financial Economics Minor (Arkansas)
N/a	Introduction to Econometrics	Courses offered as Financial Economics Minor (Arkansas)
N/a	Corporate Finance	Courses offered as Financial Economics Minor (Arkansas)

PL 4

International and Development Economics	**UA Equivalents**	**Notes/ Course Descriptions**
Choose three courses listed below:		
International trade	International Trade	
International Monetary Economics	International Macro and Finance	

Economic Development	Econ Development, Poverty, WB and IMF	
Soviet-Type Economies in Transition	N/a	Economic institutions, resource allocation mechanisms, incentives and decision-making in a Soviet-type economy; economics of transition to a market-oriented system. Particular attention is paid to price liberalization, development of the financial system, privatization of state-owned assets, opening to the world economy, and the role of private sector. (Indiana)

PL 5

Economics of the Public Sector and Labor Markets	**UA Equivalents**	**Notes/ Course Descriptions**
Choose three courses listed below:		
Economics of Labor Markets	Labor Economics	
Law and Economics	N/a	Devoted to economic analysis of law, focusing on the economic efficiency of common law. Main components of the course are property law, contracts, and torts; some aspects of criminal law are also covered. Discussion is based mostly on examples, both invented and taken from actual cases. (Indiana)
Public Finance: Government Spending	N/a (Public Economics)	Theory of public goods and externalities. Cost-benefit analysis. Public choice theory. Analysis of specific expenditure, transfer, and regulatory programs. (Indiana)
Public Finance: Taxation	N/a (Public Economics)	U.S. tax structure, income redistribution effects, and efficiency in resource allocation. Use of welfare theory and microeconomic models to evaluate particular issues. (Indiana)

PL 6

Strategic Interaction	**UA Equivalents**	**Notes/Course Descriptions**
Choose three courses listed below:		
Game Theory	N/a	Mathematical analysis of strategic interaction. No cooperative games played once or repeatedly, with perfect or imperfect information. Necessary condition for a solution (equilibrium) as well as sufficient conditions (refinements). Cooperative games, such as bargaining and market games. Numerous applications, including experimental games. (Indiana)
Law and Economics	N/a	Devoted to economic analysis of law, focusing on the economic efficiency of common law. Main components of the course are property law, contracts, and torts; some aspects of criminal law are also covered. Discussion is based mostly on examples, both invented and taken from actual cases. (Indiana)
Economics of Industry	Economics of Organizations	
Seminar in Experimental Economics	Experimental Economics	

PL 7

Advanced Computation/Econometric Tools	**UA Equivalents**	**Notes/ Course Descriptions**
Choose three courses listed below:		

Undergraduate Seminar in Computational Methods and Econometrics	N/a	Applications of econometric methods; treatment of heteroscedasticity, autocorrelation, regression using time-series data, the analysis of panel data, binary and multinomial choice models, and models for simple selection. (Indiana)
Econometric Theory and Practice 1	Introduction to Econometrics	
Econometric Theory and Practice 2	Forecasting	

PL 8

Behavioral Economics	**UA Equivalents**	**Notes/ Course Descriptions**
Choose three courses listed below:		
N/a	Behavioral Economics	Courses offered as Behavioral Economics minor (Arkansas)
N/a	Experimental Economics	Courses offered as Behavioral Economics minor (Arkansas)
N/a	Econometrics	Courses offered as Behavioral Economics minor (Arkansas)

PL 9

Required Courses- BS only	**UA Course Equivalent**	**Note/ Course Description**
Principles of Micro	ECON 2023	
Principles of Macro	ECON 2013	
Intermediate Micro	ECON 3033	
Intermediate Macro	ECON 3133	
3271 Introduction to Econometrics	ECON 4743	
4371 Econometrics	ECON 4753	
Quantitative Economics	N/a	The aim of this course is to provide an introduction to the mathematical language of economic theory. Topics include linear models, matrix algebra, rules of differentiation and comparative static analysis, optimization.
Senior Seminar	N/a	Seminar for graduating seniors who are majoring in economics. Multiple writing assignments will emphasize synthesis of theoretical, empirical, and institutional economics. Not open to non-majors.
Economics Electives (hours)	9	

Writing Requirement	N/a	Writing Intensive courses are offered for a number of different economics topics and require different prerequisites for each.
Linear Algebra	MATH 3083	
Calculus 1	MATH 2554	
Calculus 2	MATH 2564	
Calculus 3	MATH 2574	
Mathematical Stats & Applied Statistical Methods	MATH 3013, STAT 4003	
Probability Theory & Statistical Inference	STAT 5103, STAT 5113	
Introduction to Advanced Mathematics	MATH 2803	
Differential Equations	MATH 2584	
Statistical Software and Data Analysis	ISYS 4193	
Applied Categorical Data Analysis	STAT 4333	
Applied Nonparametric Methods	STAT 4033	
Sampling Techniques	STAT 4043	
Biostatistics and Clinical Trials	N/a	Study of statistical techniques for the design and analysis of clinical trials, laboratory studies and epidemiology. Topics include randomization, power and sample size calculation, sequential monitoring, carcinogenicity bioassay and case-cohort designs.
Applied Longitudinal Data Analysis	N/a	Repeated measurements; event history studies; linear and nonlinear mixed effects models; growth models; marginal mean and rate models; pattern-mixture models; selection models; non-informative and informative dropout; joint analysis of longitudinal and survival data.
Applied Statistical Models 1	STAT 5313	
Applied Multivariate Data Analysis	ISYS 5723	
Applied Spatial Statistics	STAT 5413	
Introduction to Bayesian Data Analysis	N/a	Bayes formulas, choices of prior, empirical Bayesian methods, hierarchical Bayesian methods, statistical computation, Bayesian estimation, model selection, predictive analysis, applications, Bayesian software.
Non-parametric methods	STAT 4033	

Categorical Data Analysis	STAT 5333	
Time Series Analysis	STAT 5383	

PL 10

Required Courses- BS (Applied)	UA Course Equivalent	Note/ Course Description
Principles of Micro	ECON 2023	
Principles of Macro	ECON 2013	
Intermediate Micro	ECON 3033	
Intermediate Macro	ECON 3133	
3271 Introduction to Econometrics	ECON 4743	
Stat 2500	WCOB 1033	
Quantitative Economics	N/a	Seminar for graduating seniors who are majoring in economics. Multiple writing assignments will emphasize synthesis of theoretical, empirical, and institutional economics. Not open to non-majors.
4371 Econometrics	ECON 4753	
Stat 3500	N/a	Continuation of STAT 2500. Coverage of additional topics including: Regression; model building; ANOVA; nonparametric methods; use of a statistical computer package.
4000+ Econ Elective	N/a	
Economics Electives (hours)	9	
Writing Requirement	N/a	Writing Intensive courses are offered for a number of different economics topics and require different prerequisites for each.
Complementary Field Courses (hours)	12	Any course in Computer Science, Information Systems, of any 2000+ Accounting, Finance, Math, Stat or other STEM courses
Calculus 1	MATH 2554	
Survey of Calculus, Finite Mathematics	MATH 2043, MATH 2053	

PL 11

Required Courses- BS (Quantitative)	UA Course Equivalent	Note/ Course Description
Principles of Micro	ECON 2023	
Principles of Macro	ECON 2013	

Intermediate Micro	ECON 3033	
Intermediate Macro	ECON 3133	
Introduction to Econometrics	ECON 4743	
Quantitative Economics	N/a	Seminar for graduating seniors who are majoring in economics. Multiple writing assignments will emphasize synthesis of theoretical, empirical, and institutional economics. Not open to non-majors.
Linear Algebra	MATH 3083	
Calculus 1	MATH 2554	
Calculus 2	MATH 2564	
Calculus 3	MATH 2574	
Mathematical Stats & Applied Statistical Methods	MATH 3013, STAT 4003	
Probability Theory & Statistical Inference	MATH 3013, STAT 4003	
Differential Equations	MATH 2584	
Introduction to Advanced Mathematics	MATH 2803	
4000+ Statistics Course	N/a	
Complementary Field Courses (hours)	3	Any course in Computer Science, Information Systems, of any 2000+ Accounting, Finance, Math, Stat or other STEM courses
Economics Electives (hours)	9	
Writing Requirement	N/a	Writing Intensive courses are offered for several different economics topics and require different prerequisites for each.

PL 12

Courses	Frequency
Economic Analysis of Law	4
Environmental Economics*	2
Economics of Education*	2
Health Economics*	2
Undergraduate Seminar- Computational Methods in Econometrics	2
Industrial Economics*	2
Game Theory	2
Sports Economics	1

Economic History of the U.S.	1
Soviet Type Economies in Transition	1
Public Finance: Government Spending	1
Public Finance: Taxation	1
Urban Economics	1
Economics of Growth and Development	1

Further Information and Possible Research Topics

- Institution of a plus/minus grading system on student performance
- Math requirements effect on students who declare a major in Economics
- Implications of modeling degree plans to corporate partners/career paths
- Anticipated GPA and its effect on enrolled major
- Honors designations and its effect on post graduate salary expectations
- Economics major exit survey
- Marketing strategy for Economics program

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